

## THIRTEEN-COLOR PHOTOMETRY OF 1380 BRIGHT STARS

H. L. JOHNSON

Instituto de Astronomía, Universidad Nacional Autónoma de México; and  
Steward Observatory, University of Arizona

AND

R. I. MITCHELL

Centro de Educación Científica y Educación Superior, Ensenada, B. C.

*Received 1975 August 1*

## RESUMEN

Se presentan los datos finales obtenidos de nuestro programa de observación en el sistema fotométrico de 13 colores con ancho de banda intermedia.

Para declinaciones al norte de  $-20^\circ$  se observaron prácticamente todas las estrellas más brillantes que la quinta magnitud visual, y para declinaciones al sur de  $-20^\circ$ , prácticamente todas las estrellas más brillantes que la cuarta magnitud visual. Las observaciones del norte y del sur han sido cuidadosamente comparadas entre sí y creemos que este sistema es muy homogéneo sobre todo el cielo.

La determinación de las longitudes de onda efectivas para cada filtro se discute en detalle y se deriva una nueva calibración absoluta del sistema que se basa en todos los datos disponibles. Por lo tanto este sistema fotométrico debe ser útil para la estandarización tanto de otros sistemas fotométricos como de espectrofotometría de banda angosta.

## ABSTRACT

In this paper we publish our final data from our extended program of the observation on our 13-color medium-narrow-band photometric system. We have observed essentially all of the stars brighter than the fifth visual magnitude north of declination  $-20^\circ$ , and essentially all of the stars brighter than the fourth visual magnitude south of declination  $-20^\circ$ . The observations have been carefully tied together and we believe that the system is homogeneous to an unusual degree over the entire sky. The effective wavelengths of the filter-bands have been discussed in detail and a new absolute calibration, based upon all of the available data is derived. This photometric system should be useful, therefore, for the standardization of other photometric systems, as well as the narrow-band spectrophotometry.

*Key words:* PHOTOMETRY, MEDIUM-NARROW-BAND.

## I. INTRODUCTION

During much of the past 10 years, we have spent some time —off and on— observing bright stars on our 13-color medium-narrow-band photometric system. Up to the present time, we have observed essentially all of the stars brighter than the fifth visual magnitude which lie in the part of the sky which is easily accessible from an observing site near

Tucson, i.e., from the north celestial pole to  $-20^\circ$  declination; we have also observed essentially all of the stars brighter than the fourth visual magnitude which lie in the region from  $-20^\circ$  declination to the south celestial pole. In addition to these, we have observed many other fainter stars from the Bright Star Catalogue.

Our latest work has been on the southern stars, south of declination  $-20^\circ$ . Since we have now

finished this last part of our observational work on this program, it is appropriate to summarize the work and to publish a final table containing all of the available observational data on our 13-color photometric system, for stars listed in the Catalogue of Bright Stars. Although some of these data and descriptions of the 13-color system have already been published elsewhere (Johnson, Mitchell and Latham 1967; Mitchell and Johnson 1969), we repeat them here so that this publication is complete in itself. Furthermore, many of the data published earlier have been revised and the data published here constitute the final homogeneous definition of the 13-color photometric system. These data are listed in the final table of this paper (Table 7); the star numbers in the first column and the star names are from the Catalogue of Bright Stars (Hoffleit 1964); the remaining columns are explained below.

## II. INSTRUMENTATION

At the beginning, we decided to adopt essentially the system of Borgman (1963), plus six additional similar filter bands in the red and infrared. The system plan, compared with that for our UBVR system (Johnson, Mitchell, Iriarte and Wisniewski 1966) is shown in Figure 1. The wavelengths of maximum sensitivity and the half-intensity widths are indicated on the figure for the several filter bands.

Almost all of our northern observations (north of declination  $-20^\circ$ ) were obtained using the 21-inch

photometric telescope of the Catalina observing station of the Lunar and Planetary Laboratory of the University of Arizona (unfortunately, this telescope has since been dismantled). A few observations were taken with the 28-inch telescope or the same site. The southern observations (those south of declination  $-20^\circ$ ), and the observations of northern stars needed to tie the northern and southern data together, were obtained with one of the 16-inch telescopes of the Cerro Tololo Inter-American Observatory in Chile. A few observations were taken with the Lowell 24-inch telescope or this site.

For this work, we separated the filter system into two parts. The first consists of the eight "blue" filter bands, called the 8-C system. The second consists of the five "red" filter bands plus one overlap band (the 58' filter), called the 6-RC system. This separation was made so as to use the S-4 cathode of the RCA-1P21 and the S-1 cathode of the RCA-7102 photomultipliers with maximum efficiency. The RCA-7102 was used instead of the ITT FW-118 (which we tried first) because of its much greater stability and better linearity. Our primary purpose was the setting up of an accurate photometric system rather than the mere detection of the faintest possible objects. The FW-118 proved to be unsuitable for our purpose.

Two separate photometers, identical except for the filters and the photomultipliers, were constructed for this program. After the northern portion of this program was completed, these photometers were transported to Chile, where they were used to obtain

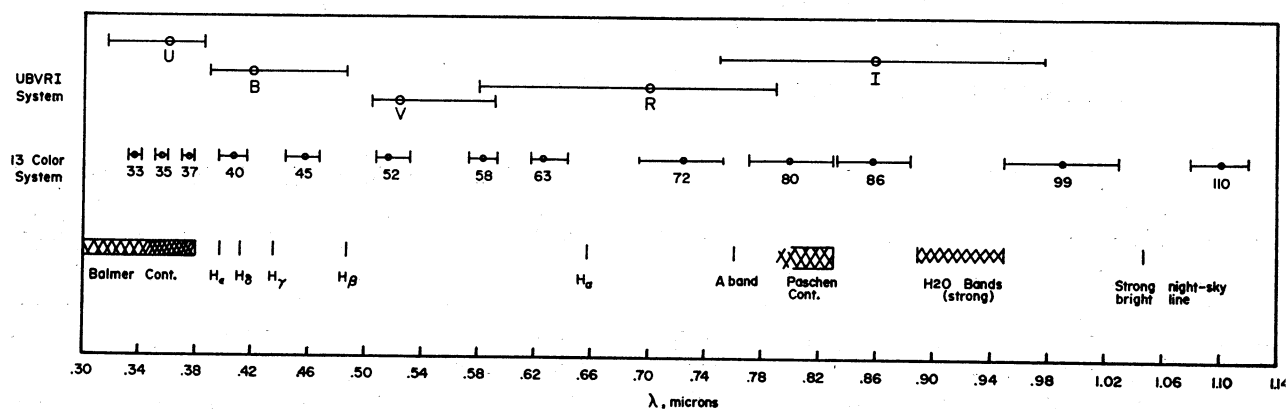


FIG. 1. The 13-color system compared with the UBVR system and with certain stellar or atmospheric features.

the southern observations. Thus, this whole-sky photometric program is homogeneous to an unusual degree —the same photometers, filters and detectors, were used for both the northern and the southern observations. These two photometers are now in use at the Observatorio Astronómico Nacional in San Pedro Mártir, Baja California, where observations on the 13-color system are being made of additional bright stars and other fainter objects of astrophysical interest.

It can be seen from Figure 1 that the filters of the 13-color system are identified by numbers indicating their approximate effective wavelengths, i.e., 33, 35, 37, 40, 45, 52, 58, 63, 72, 80, 86, 99 and 110. Thus, the 33 filter has an effective wavelength of approximately 0.33 micron (3300 Å), etc.

There is an additional filter, 58', which is used to tie together the observations with the two photomultipliers on a purely color basis; the colors do not depend upon the differential stabilities of the two photomultipliers since the 8-C and 6-RC systems are tied together by duplicate observations in the 58 filter band. The 52 magnitudes depend only upon the 1P21, which has been demonstrated to be stable and very linear over a much wider range of magnitudes than are reported in this paper (Johnson and Morgan 1953).

The filter-detector response functions are presented in tabular form in Tables 1 and 2; all data have been normalized to 100 percent at the filter-band peaks. Table 3 contains certain derived data for the 13 bands of the system. The effective wave-

TABLE 1  
FILTER-DETECTOR RESPONSE FUNCTIONS  
PERCENT OF PEAK RESPONSE

| <u>33</u>    |      | <u>35</u>    |       | <u>37</u>    |       | <u>40</u>    |       | <u>45</u>    |       | <u>52</u>    |      | <u>58</u>    |       | <u>63</u>    |      |
|--------------|------|--------------|-------|--------------|-------|--------------|-------|--------------|-------|--------------|------|--------------|-------|--------------|------|
| $\lambda(A)$ | %    | $\lambda(A)$ | %     | $\lambda(A)$ | %     | $\lambda(A)$ | %     | $\lambda(A)$ | %     | $\lambda(A)$ | %    | $\lambda(A)$ | %     | $\lambda(A)$ | %    |
| 3157         | 0.7  | 3060         | 0.1   | 3204         | 0.2   | 3187         | 0.2   | 4004         | 0.1   | 4704         | 0.4  | 5249         | 0.0   | 6024         | 0.1  |
| 3254         | 6.9  | 3204         | 2.2   | 3500         | 2.4   | 3404         | 1.1   | 4254         | 1.0   | 4904         | 3.2  | 5604         | 7.7   | 6077         | 4.4  |
| 3293         | 21.5 | 3404         | 8.8   | 3603         | 6.7   | 3602         | 2.7   | 4354         | 7.1   | 5004         | 15.0 | 5648         | 14.6  | 6111         | 17.5 |
| 3311         | 33.3 | 3461         | 19.0  | 3672         | 22.2  | 3749         | 5.3   | 4382         | 15.9  | 5028         | 20.4 | 5693         | 26.4  | 6142         | 31.5 |
| 3317         | 43.4 | 3490         | 28.8  | 3690         | 33.3  | 3805         | 7.7   | 4400         | 23.8  | 5048         | 30.0 | 5717         | 37.4  | 6157         | 43.3 |
| 3319         | 45.7 | 3504         | 38.9  | 3704         | 44.4  | 3904         | 20.5  | 4413         | 31.7  | 5062         | 39.5 | 5735         | 49.4  | 6170         | 52.5 |
| 3328         | 58.7 | 3515         | 48.6  | 3708         | 47.8  | 3935         | 33.9  | 4424         | 39.7  | 5077         | 48.8 | 5749         | 57.1  | 6180         | 61.2 |
| 3337         | 71.5 | 3522         | 59.2  | 3711         | 55.6  | 3956         | 45.2  | 4437         | 47.6  | 5082         | 55.5 | 5755         | 61.7  | 6194         | 69.6 |
| 3345         | 84.5 | 3533         | 69.5  | 3717         | 66.7  | 3964         | 49.7  | 4443         | 55.6  | 5086         | 58.0 | 5762         | 65.5  | 6201         | 79.6 |
| 3354         | 96.6 | 3538         | 79.7  | 3726         | 77.8  | 3974         | 56.5  | 4451         | 63.5  | 5095         | 65.1 | 5770         | 75.3  | 6208         | 87.5 |
| 3358         | 99.7 | 3547         | 89.7  | 3734         | 88.9  | 3988         | 67.8  | 4460         | 71.4  | 5107         | 76.1 | 5783         | 83.1  | 6211         | 89.2 |
| 3380         | 91.4 | 3565         | 100.0 | 3748         | 97.8  | 4003         | 79.1  | 4472         | 79.4  | 5117         | 84.9 | 5798         | 88.8  | 6223         | 90.6 |
| 3388         | 79.3 | 3576         | 90.5  | 3750         | 100.0 | 4024         | 90.4  | 4487         | 87.3  | 5130         | 92.8 | 5810         | 97.2  | 6230         | 96.3 |
| 3396         | 68.7 | 3584         | 80.5  | 3767         | 88.9  | 4070         | 100.0 | 4520         | 95.2  | 5160         | 99.8 | 5827         | 100.0 | 6245         | 98.7 |
| 3399         | 66.9 | 3586         | 70.4  | 3776         | 77.8  | 4113         | 90.4  | 4571         | 100.0 | 5177         | 99.2 | 5850         | 96.3  | 6252         | 99.7 |
| 3410         | 54.2 | 3599         | 61.0  | 3782         | 66.7  | 4131         | 79.1  | 4597         | 95.2  | 5226         | 96.3 | 5854         | 95.2  | 6267         | 96.7 |
| 3422         | 41.1 | 3610         | 51.2  | 3794         | 55.6  | 4146         | 67.8  | 4615         | 87.3  | 5248         | 91.7 | 5884         | 80.0  | 6288         | 96.2 |
| 3442         | 27.7 | 3612         | 40.7  | 3803         | 44.4  | 4159         | 56.5  | 4630         | 79.4  | 5269         | 81.1 | 5907         | 66.5  | 6310         | 90.0 |
| 3448         | 22.8 | 3626         | 30.8  | 3818         | 33.3  | 4170         | 45.2  | 4643         | 71.4  | 5284         | 70.9 | 5925         | 54.5  | 6349         | 81.5 |
| 3491         | 8.8  | 3642         | 21.0  | 3842         | 22.2  | 4185         | 33.9  | 4654         | 63.5  | 5292         | 62.5 | 5940         | 45.7  | 6355         | 77.0 |
| 3602         | 1.2  | 3704         | 6.0   | 3884         | 11.1  | 4203         | 22.6  | 4669         | 55.6  | 5302         | 54.3 | 5956         | 36.4  | 6443         | 47.6 |
| 3719         | 0.1  | 3830         | 0.1   | 3904         | 8.9   | 4236         | 11.3  | 4679         | 47.6  | 5316         | 46.0 | 5971         | 29.0  | 6601         | 21.2 |
|              |      |              |       | 4082         | 0.0   | 4254         | 6.9   | 4694         | 39.7  | 5322         | 37.4 | 5981         | 23.4  | 6691         | 8.2  |
|              |      |              |       |              |       | 4304         | 2.0   | 4708         | 31.7  | 5336         | 30.4 | 5986         | 21.8  | 6840         | 5.1  |
|              |      |              |       |              |       | 4564         | 0.0   | 4730         | 23.8  | 5350         | 22.0 | 6001         | 16.6  | 6987         | 2.3  |
|              |      |              |       |              |       |              |       | 4772         | 16.0  | 5375         | 13.8 | 6021         | 10.9  | 7134         | 0.8  |
|              |      |              |       |              |       |              |       | 4876         | 7.9   | 5404         | 7.3  | 6048         | 6.4   |              |      |
|              |      |              |       |              |       |              |       | 4999         | 4.1   | 5523         | 1.0  | 6099         | 2.3   |              |      |
|              |      |              |       |              |       |              |       | 5309         | 1.6   | 5704         | 0.2  | 6104         | 1.9   |              |      |
|              |      |              |       |              |       |              |       | 5604         | 0.5   |              |      | 6229         | 0.2   |              |      |

TABLE 2  
FILTER-DETECTOR RESPONSE FUNCTIONS  
PERCENT OF PEAK RESPONSE

| 58'                   |       | 72                    |       | 80                    |       | 86                    |       | 99                    |       | 110                   |       |
|-----------------------|-------|-----------------------|-------|-----------------------|-------|-----------------------|-------|-----------------------|-------|-----------------------|-------|
| $\lambda(\text{\AA})$ | %     | $\lambda(\text{\AA})$ | %     | $\lambda(\text{\AA})$ | %     | $\lambda(\text{\AA})$ | %     | $\lambda(\text{\AA})$ | %     | $\lambda(\text{\AA})$ | %     |
| 5560                  | 0.2   | 6650                  | 0.9   | 7600                  | 1.5   | 8200                  | 1.4   | 9200                  | 2.3   | 10200                 | 5.0   |
| 5580                  | 0.3   | 6700                  | 1.3   | 7650                  | 2.6   | 8233                  | 2.3   | 9250                  | 2.7   | 10300                 | 10.6  |
| 5600                  | 0.4   | 6750                  | 1.8   | 7700                  | 9.0   | 8267                  | 8.0   | 9300                  | 4.3   | 10400                 | 16.0  |
| 5620                  | 0.5   | 6800                  | 2.3   | 7750                  | 32.2  | 8300                  | 26.6  | 9350                  | 7.0   | 10500                 | 23.1  |
| 5640                  | 0.7   | 6850                  | 8.6   | 7800                  | 67.5  | 8333                  | 64.5  | 9400                  | 10.6  | 10600                 | 36.3  |
| 5660                  | 1.4   | 6900                  | 18.1  | 7850                  | 87.6  | 8367                  | 99.7  | 9450                  | 23.8  | 10700                 | 52.3  |
| 5680                  | 2.6   | 6950                  | 80.4  | 7900                  | 88.7  | 8400                  | 81.7  | 9500                  | 39.9  | 10800                 | 72.9  |
| 5700                  | 5.5   | 7000                  | 87.1  | 7950                  | 92.9  | 8433                  | 76.7  | 9550                  | 72.6  | 10900                 | 88.6  |
| 5720                  | 15.0  | 7050                  | 86.7  | 8000                  | 100.0 | 8467                  | 77.2  | 9600                  | 99.9  | 11000                 | 100.0 |
| 5740                  | 40.1  | 7100                  | 86.1  | 8050                  | 98.5  | 8500                  | 82.4  | 9650                  | 100.0 | 11100                 | 96.3  |
| 5760                  | 78.4  | 7150                  | 89.9  | 8100                  | 85.3  | 8533                  | 94.3  | 9700                  | 86.5  | 11200                 | 78.9  |
| 5780                  | 94.2  | 7200                  | 96.3  | 8150                  | 77.1  | 8567                  | 98.8  | 9750                  | 79.4  | 11300                 | 66.3  |
| 5800                  | 92.6  | 7250                  | 100.0 | 8200                  | 74.0  | 8600                  | 100.0 | 9800                  | 76.9  | 11400                 | 48.0  |
| 5820                  | 94.0  | 7300                  | 99.4  | 8250                  | 32.3  | 8633                  | 98.9  | 9850                  | 74.3  | 11500                 | 36.3  |
| 5840                  | 99.5  | 7350                  | 96.2  | 8300                  | 15.8  | 8667                  | 93.1  | 9900                  | 73.2  | 11600                 | 28.6  |
| 5860                  | 100.0 | 7400                  | 88.9  | 8350                  | 3.0   | 8700                  | 90.7  | 9950                  | 70.7  | 11700                 | 21.1  |
| 5880                  | 96.0  | 7450                  | 81.6  | 8400                  | 1.4   | 8733                  | 87.3  | 10000                 | 66.1  | 11800                 | 17.4  |
| 5900                  | 91.2  | 7500                  | 65.7  |                       |       | 8767                  | 79.9  | 10050                 | 61.5  | 11900                 | 13.7  |
| 5920                  | 90.9  | 7550                  | 45.4  |                       |       | 8800                  | 70.8  | 10100                 | 53.1  | 12000                 | 10.0  |
| 5940                  | 86.2  | 7600                  | 21.8  |                       |       | 8833                  | 55.5  | 10150                 | 47.4  |                       |       |
| 5960                  | 59.4  | 7650                  | 11.1  |                       |       | 8867                  | 32.1  | 10200                 | 37.1  |                       |       |
| 5980                  | 26.8  | 7700                  | 5.0   |                       |       | 8900                  | 14.0  | 10250                 | 29.2  |                       |       |
| 6000                  | 11.7  | 7750                  | 2.1   |                       |       | 8933                  | 6.3   | 10300                 | 18.6  |                       |       |
| 6020                  | 5.0   | 7800                  | 1.3   |                       |       | 8967                  | 3.7   | 10350                 | 10.8  |                       |       |
| 6040                  | 2.5   |                       |       |                       |       | 9000                  | 1.8   | 10400                 | 6.5   |                       |       |
| 6060                  | 1.3   |                       |       |                       |       |                       |       | 10450                 | 3.1   |                       |       |
| 6080                  | 0.7   |                       |       |                       |       |                       |       | 10500                 | 2.0   |                       |       |
| 6100                  | 0.2   |                       |       |                       |       |                       |       | 10550                 | 1.2   |                       |       |
| 6120                  | 0.2   |                       |       |                       |       |                       |       | 10600                 | 0.5   |                       |       |
| 6140                  | 0.0   |                       |       |                       |       |                       |       |                       |       |                       |       |

lengths and rectangular effective bandpasses are given in the second and third columns, while the absolute calibration of the system (to be described below) is given in the last column.

The observations were made in the manner described by Johnson and Morgan (1953), a procedure which has long been standard in our work. A description of a photometer system similar to those employed in this work was given by Johnson and Mitchell (1962).

A summary of the data reduction procedures also appears there, but a more detailed description will be published in the near future by Mitchell. Most of the observations of "northern" stars were made by Mr. A. S. Latham and Mr. E. Rhoads. Most of the "southern" observations were made by Mr. Fred Forbes and Mitchell (approximately equal numbers each), but a few of the "southern" observations were made by Mr. W. Stonaker. In addition to our own observations, we have republished in Table 7

TABLE 3  
ABSOLUTE CALIBRATIONS FOR THE  
13 FILTER-BANDS

| Filter | $\lambda$<br>(Å) | Effective<br>Rectangular<br>Bandpass<br>(%) | Relative Energy<br>of our mean<br>A0 V Star*<br>(mag) |
|--------|------------------|---------------------------------------------|-------------------------------------------------------|
| 33     | 3371             | 3.3                                         | +0.263                                                |
| 35     | 3536             | 3.6                                         | +0.302                                                |
| 37     | 3751             | 3.4                                         | +0.005                                                |
| 40     | 4030             | 5.6                                         | -0.640                                                |
| 45     | 4571             | 6.1                                         | -0.381                                                |
| 52     | 5183             | 5.0                                         | 0.000                                                 |
| 58     | 5827             | 3.8                                         | +0.670                                                |
| 63     | 6356             | 5.1                                         | +0.670                                                |
| 72     | 7241             | 8.1                                         | +1.087                                                |
| 80     | 8000             | 5.4                                         | +1.436                                                |
| 86     | 8584             | 5.6                                         | +1.652                                                |
| 99     | 9831             | 5.9                                         | +1.973                                                |
| 110    | 11084            | 7.4                                         | +2.384                                                |

\* The flux density for zero magnitude A0 V (the mean of our six A0 V stars) for filter 52 is  $4.30 \times 10^{-12}$  watt  $\text{cm}^{-2} \mu^{-1}$ .

the southern 8-C observations by Mendoza (1969, 1971a, 1971b and 1971c). Mendoza used a duplicate set of the 8-C filters (manufactured at the same time as the set we used), with different detectors (EMI-6256A and other RCA-1P21), for his observations. There is sufficient overlap between Mendoza's observations and ours so that we were able to establish that his data are exactly on our system (this is the expected result because of the essentially common filters). We have, therefore, included Mendoza's data in Table 7 as if the observations had been made with our photometers. Since these two series of "southern" observations were independently tied to the "northern" system, their agreement is strong evidence of the homogeneity of our photometry over the entire sky.

We have made extensive comparisons of the "northern" data with other series of photometric observations. No significant systematic errors appear to exist in our final data. We do not repeat here these comparisons but, instead, refer the reader to the papers of Mitchell and Johnson (1969) and Johnson, Mitchell and Latham (1967).

Furthermore, we have made comparisons with the southern data of Willstrop (1960, 1969) with the extensive wide-band photometry done at the Royal

Observatory at the Cape of Good Hope, South Africa (Cousins and Stoy 1963; Cousins *et al.* 1966). From these comparisons (as well as the comparison with Mendoza's work), we have every reason to believe that the 13-color photometric system is homogeneous and free from significant systematic errors, either in right ascension or declination. In particular, there is no discernible systematic difference between our "northern" and our "southern" observations.

Our observational procedure always includes the taking of a reading of a stable standard light source immediately following every observation of each star; this standard-source reading is then used to calibrate the photometer for this observation. Unfortunately, during one of the southern observing runs the standard light source was not operating correctly and it was therefore not possible to make these gain calibrations. Of course, the colors of the stars were not affected because our reduction procedure works entirely in terms of colors, except for the 52 magnitude (this is true even between the 8-C and the 6-RC observations because of the duplication of the 58 filter in the two photometers). Because we do not trust magnitudes not calibrated by a standard source, we omitted our 52 magnitudes for these few stars and substituted Cape V magnitudes (Cousins and Stoy 1963; Cousins *et al.* 1966) transformed to 52 by the equation

$$52 = V + 0.378(52 - 58) + 0.225(52 - 58)^2 \quad (1)$$

In Table 7, an X immediately to the left of the 52 magnitude designates a 52 magnitude derived in this fashion.

### III. THEORY OF FILTER PHOTOMETRY

There are several methods which have been used to define the effective wavelengths of filter bands such as ours. Probably the simplest (and crudest) one is to take the wavelength of the maximum response (peak wavelength) as representative of the filter performance. A more refined method, which takes into account both the wavelength dependences of the filter transmission and of the emission from the star, has often been used. The formula by which this wavelength is calculated is



$$\lambda_e = \int_0^\infty \lambda S(\lambda) \phi(\lambda) d\lambda / \int_0^\infty S(\lambda) \phi(\lambda) d\lambda, \quad (2)$$

where  $S(\lambda)$  is the relative spectral energy distribution of the source and  $\phi(\lambda)$  is the relative sensitivity of the measuring instrument, including the telescope. Since this wavelength,  $\lambda_e$ , depends upon  $S(\lambda)$ , the spectral energy distribution of the source star, it is evident that there is a different value of  $\lambda_e$  for each star. This means that, if we were to adopt this definition for the effective wavelengths of our observations, we would have to give not merely a single table of effective wavelengths, but such a table *for each star*. Obviously, it would be much more convenient if a single effective wavelength, independent of the spectrum of the source star, can be specified for each filter band. Fortunately, it is indeed possible to specify such a source-independent effective wavelength.

This is done by defining the effective wavelength of a filter-band as

$$\lambda_0 = \int_0^\infty \lambda \phi(\lambda) d\lambda / \int_0^\infty \phi(\lambda) d\lambda \quad (3)$$

This expression is Equation (2) with the source spectrum omitted (set to unity for all wavelengths). The appropriateness of this definition has been discussed by Strömberg (1937), Wesselink (1950) and King (1952*a*, 1952*b*). King (1952*b*) also showed how the use of Equation (2) as an effective wavelength definition leads to misinterpretation of the results of broadband photometry.

Filter-magnitudes behave to a first-order approximation like monochromatic magnitudes at wavelength  $\lambda_0$ . In fact, Equation (3) is the result when the second order term of the Taylor's expansion of the ratio of the filtered intensities of two stars is set to zero (King 1952*a*); only third and higher-order terms remain which, as we shall see, are quite small for the narrow filters of the 13-color system.

With this concept, there is no meaningful way to define the effective wavelength of a single star, unless the definition tacitly assumes a second star (or a standard lamp) as the standard. This is not a significant restriction, however, since we want ultimately to calibrate our 13-color measures in terms of a calibrated standard lamp, or other calibrated

source. The problem of defining effective wavelengths for the filter bands can be rendered manageable by choosing a single (approximate) effective wavelength, e.g., Equation (3) for each filter band, no matter how broad, and correcting the observed magnitude differences (or intensity ratios) for the errors (the higher-order terms of the Taylor's expansion) introduced by this approximation.

Thus, under this concept, the meaning of the term "effective wavelength" is the following: the effective wavelength of a comparison of two stars (or a star and a standard lamp) by the same instrument is that wavelength at which a monochromatic receiver would measure the same magnitude difference as does the actual instrument. (The term "monochromatic" is not used here in the strict sense, but refers to a smoothed energy distribution over the region of the filter bandpass). It therefore follows that we must choose a type of star (or even a single star) which we adopt as the standard of reference. This is, of course, standard procedure in setting up photometric systems; a particular star, or the mean of several stars, is chosen to have color-indices equal to zero and appropriate zero-point corrections are made to all other star's observations.

When the UBV system was originally defined (Johnson and Morgan 1953), it was decided, for good reasons explained there, to set the zero-points of the color-indices to zero for the unweighted mean values for six bright stars of spectral class A0 V; these six stars are:  $\alpha$  Lyr,  $\gamma$  UMa, 109 Vir,  $\alpha$  CrB,  $\gamma$  Oph and BS 3314. We have adopted the same definition of the zero-points of the color-indices for the 13-color system, i.e., the means of the 12 color-indices observed for these six stars are zero, by definition. This means that the absolute calibration of the 13-color system which is derived below applies, strictly speaking, solely to stars whose "smoothed monochromatic" spectral energy distributions are the same as the mean A0 V star, represented by the mean values for the six stars listed above. When our absolute calibration is applied to stars or other objects which have spectral energy distributions different from the standard, corrections for the error introduced by our effective wavelength approximation must be applied.

At this point a small digression is in order. It has recently become common practice among photo-

metric observers, especially infrared observers, to use the single star,  $\alpha$  Lyr, as the reference standard. Intrinsically, this practice is just as valid as our adoption of the mean values of six A0 V stars as our standard. There is, however, a strong tendency to ignore the fact that the actual colors of  $\alpha$  Lyr are *not* identical with those of our mean A0 V star (also,  $V = +0.04$  for  $\alpha$  Lyr, *not* 0.00). The zero-points of our several photometric systems, the UBV system (Johnson and Morgan 1953), the UBVRIJKL system (Johnson, Mitchell, Iriarte and Wisniewski 1966) and the present 13-color system are all set by the mean values for the stars:  $\alpha$  Lyr,  $\gamma$  UMa, 109 Vir,  $\alpha$  CrB,  $\gamma$  Oph, and BS 3314. Unless the differences between the colors of  $\alpha$  Lyr and our mean A0 V star (and the difference of the V-magnitude of  $\alpha$  Lyr from zero) are taken into account, significant systematic errors in comparisons with our data may result.

At this point, we introduce a second approximation: we assume that the corrections to be applied to the absolute fluxes obtained by the use of our absolute calibration can be computed from the differences in the *black-body* gradients of the A0 V standard and the other observed objects. For example, we compute the correction to the flux observed through the 52 filter by the following procedure: first, we compute a table of corrections for the 52 filter, as a function of black-body temperature; the correction is zero for a 15 000°K black-body, which has the same gradient in the region of the 52 filter as does the A0 V standard. Second, we compute the temperature of the black-body which has the same gradient between the 52 and 58 filters as does the observed object (the 45 and 52 filters could also be used). It will normally be sufficient for this purpose to use the uncorrected absolute calibration for the two filters, although a correction could be included by a second iteration. Third, the correction to the flux measured by the 52 filter is interpolated from the blackbody correction table which we computed above as the first step in this correction procedure. Therefore:

a) Table 4a contains the correction factors by which the computed fluxes derived through the use of our absolute calibration are to be multiplied. These correction factors are, by definition, unity for an A0 V star whose colors are zero. These correction

factors differ from unity by significant amounts only for observations of cool star using the shorterwavelength filters.

b) Table 4b contains the computed black-body color gradients for the several colors, with zero-points made zero at the mean A0 V star. One enters Table 4b to obtain black-body temperatures corresponding to the observed color-indices; then, one enters Table 4a with these temperatures to obtain the corrections to the observed flux densities.

This procedure is quite manageable but, in these days of the ubiquitous computer, it can be made even more convenient. Table 5 contains a FORTRAN IV program, written for the DEC SYSTEM-10 of the University of Arizona, which computes the corrected flux densities directly from the tabulated magnitude and colors. The corrections are computed from parabolic approximations, with precision more than sufficient for this purpose. This program can easily be revised to work with other computers, and magnetic tapes of the data contained in Table 7 can be obtained by communicating with one of the authors. There will be a charge sufficient to cover the costs of producing such tapes.

#### IV. ABSOLUTE CALIBRATION

We have discussed the absolute calibrations of our photometric systems several times, each time adding new data as it became available. Our last published rediscussion (Mitchell and Johnson 1969) did not, of course, include the more recent calibrations by Oke and Schild (1970) and by Hayes (1970). When the last two publications appeared, we compared them with our 1969 calibrations and found that our results for  $\alpha$  Lyr are very similar *in color* to those of Oke and Schild and of Hayes, but that the new calibrations are about 10 percent fainter than our 1969 calibration. This 10 percent difference is nearly independent of color.

It apparently is true that the older absolute stellar calibrations (c.f., Mitchell and Johnson 1969) lead to very nearly the same absolute colors for  $\alpha$  Lyr as do the two new ones, but that they also lead to an overall flux density that is about 10 percent higher than that obtained by Oke and Schild and by Hayes.

TABLE 4a  
COMPUTED CORRECTION FACTORS, FROM  
MEASURED FILTER MAGNITUDES TO  
MONOCHROMATIC MAGNITUDES AT THE  
FILTER EFFECTIVE WAVELENGTHS

| Temp. °K | 33    | 35    | 37    | 40    | 45    | 52    | 58    | 63    | 72    | 80    | 86    | 99    | 110   |
|----------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1000     | 0.786 | 0.730 | 0.809 | 0.726 | 0.591 | 0.911 | 0.953 | 0.913 | 0.940 | 0.979 | 0.983 | 0.983 | 0.983 |
| 1500     | 0.917 | 0.880 | 0.928 | 0.877 | 0.865 | 0.971 | 0.987 | 0.979 | 0.987 | 0.997 | 0.997 | 1.000 | 1.005 |
| 2000     | 0.961 | 0.939 | 0.970 | 0.939 | 0.951 | 0.990 | 0.997 | 0.996 | 1.000 | 1.001 | 1.001 | 1.004 | 1.008 |
| 2500     | 0.980 | 0.967 | 0.988 | 0.968 | 0.983 | 0.998 | 1.001 | 1.003 | 1.005 | 1.003 | 1.002 | 1.005 | 1.008 |
| 3000     | 0.989 | 0.983 | 0.996 | 0.984 | 0.996 | 1.001 | 1.002 | 1.005 | 1.006 | 1.003 | 1.002 | 1.005 | 1.007 |
| 4000     | 0.996 | 0.995 | 1.004 | 0.996 | 1.006 | 1.003 | 1.003 | 1.006 | 1.006 | 1.003 | 1.002 | 1.003 | 1.005 |
| 5000     | 0.999 | 1.000 | 1.006 | 1.000 | 1.007 | 1.003 | 1.003 | 1.005 | 1.005 | 1.002 | 1.001 | 1.002 | 1.003 |
| 6000     | 1.000 | 1.002 | 1.007 | 1.001 | 1.006 | 1.003 | 1.002 | 1.004 | 1.004 | 1.002 | 1.000 | 1.001 | 1.003 |
| 8000     | 1.000 | 1.002 | 1.007 | 1.000 | 1.005 | 1.002 | 1.002 | 1.003 | 1.002 | 1.001 | 1.000 | 1.000 | 1.000 |
| 10000    | 1.000 | 1.001 | 1.006 | 0.998 | 1.003 | 1.001 | 1.001 | 1.002 | 1.001 | 1.000 | 0.999 | 0.999 | 0.999 |
| 15000    | 0.998 | 0.998 | 1.005 | 0.994 | 0.999 | 1.000 | 1.000 | 1.000 | 0.999 | 1.000 | 0.999 | 0.998 | 0.997 |
| 20000    | 0.998 | 0.997 | 1.004 | 0.993 | 0.998 | 0.999 | 1.000 | 0.999 | 0.998 | 0.999 | 0.998 | 0.998 | 0.994 |
| 30000    | 0.997 | 0.995 | 1.003 | 0.991 | 0.996 | 0.999 | 1.000 | 0.999 | 0.998 | 0.999 | 0.998 | 0.997 | 0.994 |
| 60000    | 0.996 | 0.994 | 1.002 | 0.988 | 0.995 | 0.998 | 0.999 | 0.998 | 0.997 | 0.999 | 0.998 | 0.997 | 0.995 |
| 100000   | 0.996 | 0.993 | 1.001 | 0.987 | 0.994 | 0.998 | 0.999 | 0.998 | 0.997 | 0.999 | 0.997 | 0.997 | 0.995 |

TABLE 4b  
COMPUTED BLACK-BODY RELATIVE GRADIENTS

| Temp. °K | 33-35  | 35-37  | 37-40  | 40-45  | 45-52  | 52-58  | 58-63  | 63-72  | 72-80  | 80-86  | 86-99  | 99-110 |
|----------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 1000     | 1.987  | 1.773  | 2.021  | 4.511  | 3.111  | 3.002  | 2.121  | 2.664  | 1.809  | 1.160  | 1.890  | 1.562  |
| 1500     | 1.238  | 0.979  | 1.004  | 2.721  | 2.170  | 1.925  | 1.340  | 1.648  | 1.161  | 0.721  | 1.117  | 0.959  |
| 2000     | 0.860  | 0.579  | 0.498  | 1.901  | 1.608  | 1.381  | 0.960  | 1.197  | 0.829  | 0.501  | 0.732  | 0.661  |
| 2500     | 0.634  | 0.338  | 0.197  | 1.424  | 1.270  | 1.052  | 0.735  | 0.900  | 0.628  | 0.369  | 0.503  | 0.484  |
| 3000     | 0.485  | 0.175  | -0.003 | 1.109  | 1.005  | 0.832  | 0.586  | 0.702  | 0.494  | 0.281  | 0.352  | 0.368  |
| 4000     | 0.300  | -0.030 | -0.249 | 0.718  | 0.691  | 0.559  | 0.398  | 0.457  | 0.327  | 0.174  | 0.168  | 0.229  |
| 5000     | 0.191  | -0.154 | -0.395 | 0.485  | 0.502  | 0.394  | 0.293  | 0.313  | 0.228  | 0.112  | 0.062  | 0.149  |
| 6000     | 0.119  | -0.237 | -0.490 | 0.330  | 0.376  | 0.287  | 0.222  | 0.219  | 0.165  | 0.072  | -0.005 | 0.099  |
| 8000     | 0.031  | -0.341 | -0.607 | 0.139  | 0.221  | 0.157  | 0.138  | 0.108  | 0.090  | 0.026  | -0.084 | 0.040  |
| 10000    | -0.020 | -0.402 | -0.674 | 0.029  | 0.132  | 0.083  | 0.091  | 0.046  | 0.048  | -0.002 | -0.127 | +0.008 |
| 15000    | -0.084 | -0.480 | -0.757 | -0.110 | 0.023  | -0.007 | 0.033  | -0.030 | 0.004  | -0.035 | -0.180 | -0.032 |
| 20000    | -0.113 | -0.515 | -0.795 | -0.172 | -0.028 | -0.048 | 0.007  | -0.065 | -0.027 | -0.047 | -0.207 | -0.051 |
| 30000    | -0.139 | -0.548 | -0.829 | -0.230 | -0.073 | -0.086 | -0.017 | -0.097 | -0.049 | -0.061 | -0.230 | -0.069 |
| 60000    | -0.162 | -0.577 | -0.858 | -0.281 | -0.114 | -0.120 | -0.039 | -0.126 | -0.069 | -0.074 | -0.252 | -0.085 |
| 100000   | -0.170 | -0.587 | -0.869 | -0.299 | -0.129 | -0.132 | -0.047 | -0.137 | -0.076 | -0.078 | -0.257 | -0.092 |

We have made several recent attempts to resolve this discrepancy and, during the same time, Hayes and Latham (1975) published a rediscussion of the work of Oke and Schild (1970) and of Hayes (1970). Hayes and Latham ignored all of the older work upon which we based our 1969 calibration because they “judged them to have inferior accuracy or because not enough information was available for us to judge their accuracy”. We do not agree with their judgment on this matter, nor do we agree

with them that “it will be difficult to improve the calibration of Vega shortward of 10 000 Å using ground- based observations”. We believe that the rediscussion by Hayes and Latham (1975) leaves much to be desired, if only because of their use of “fabricated extinction coefficients” (sic) instead of measured coefficients. In fact, they recognize this weakness in their discussion and emphasize that absolute calibration must rely only upon measured nightly extinction coefficients.



TABLE 5

A FORTRAN IV PROGRAM FOR THE  
COMPUTATION OF ABSOLUTE FLUX DENSITIES  
FROM THE 13-COLOR PHOTOMETRY

```

C      PROGRAM MK13FX.F4
      DIMENSION STAR(2), SP(2), C(12), F(13)
      DIMENSION CAL(14), CNAR(13), STMAG(13), FLUX(13)
      CALL IFILE (6,'CAL.DTA')
      CALL IFILE (9,'SLIM.DAT')
      CALL OFILE (10,'FLUX.DAT')
      READ (6,77) CAL
77     FORMAT (13F8.3,1PE10.2)
      TYPE 77, CAL
1      READ (9,177,END=4) IDA, RMRK, CNAR, NR
177    FORMAT (14,A3,2X,13F7.3,4X,12)
      IF (IDA) 4,7,2
2      STMAG(6)=CNAR(1)
      DO 10 K=1,5
      STMAG(K)=CNAR(1)+CNAR(K+1)
10     CONTINUE
      DO 20 K=7,13
      STMAG(K)=CNAR(1)-CNAR(K)
20     CONTINUE
      DO 25 K=1,12
      C(K)=STMAG(K)-STMAG(K+1)
25     CONTINUE
      DO 30 K=1,13
      STMAG(K)=STMAG(K)+CAL(K)
      FLUX(K)=CAL(14)/(10**(0.4*STMAG(K)))
30     CONTINUE
      F(1)=0.999+0.011476*C(1)-0.05738*(C(1)**2.)
      F(2)=0.997-0.04776*C(2)-0.09184*(C(2)**2.)
      F37A=1.0-0.026667*C(2)-0.053333*(C(2)**2.)
      F37B=0.992-0.030167*C(3)-0.030167*(C(3)**2.)
      F(3)=(2.0*F37A+F37B)/3.
      F(4)=1.002+0.016265*C(4)-0.024644*(C(4)**2.)
      F(5)=0.992+0.042724*C(5)-0.050862*(C(5)**2.)
      F(6)=0.997+0.012429*C(6)-0.01381*(C(6)**2.)
      F(7)=1.0+0.007833*C(6)-0.007833*(C(6)**2.)
      F(8)=0.996+0.018*(C(8)-0.018*(C(8)**2.)
      F(9)=0.997+0.024564*C(9)-0.030704*(C(9)**2.)
      F(10)=1.0+0.013401*C(9)-0.013401*(C(9)**2.)
      F(11)=0.997+0.02029*(C(10)-0.02899*(C(10)**2.)
      F(12)=0.997+0.01476*(C(11)-0.0123*(C(11)**2.)
      F(13)=0.990+0.0368*(C(12)-0.02831*(C(12)**2.)
      DO 40 K=1,13
      FLUX(K)=FLUX(K)*F(K)
40     CONTINUE
      IF (NR) 31,31,32
31     WRITE (10,577) IDA, RMRK, (FLUX(I), I=1,8)
577    FORMAT (14,A3,2X,8(1PE9.2),35X)
      GO TO 1
32     WRITE (10,677) IDA, RMRK, FLUX
677    FORMAT (14,A3,2X,13(1PE9.2))
      GO TO 1
7      WRITE (10,777)
777    FORMAT (/)
      GO TO 1
4      CALL EXIT
      END

```

A new effort to obtain an absolute calibration of the 13-color photometric system is now being made by Chavarría and Johnson. We are measuring extinction coefficients carefully in all 13 filter bands, on each night. The calibrations of the standard lamps are based upon calibrations by the National Bureau of Standards.

Table 6 contains the results from three different, independent, absolute calibrations of  $\alpha$  Lyr for  $\lambda 5556$  Å, that of Mitchell and Johnson (1969) based upon work earlier than 1969, that of Hayes and Latham (1975) and a new, tentative result from

TABLE 6

THREE ABSOLUTE CALIBRATIONS AT  $\lambda 5556$  Å  
FOR  $\alpha$  LYR

| Observer                     | Flux Density<br>( $10^{-12}$ watt $\text{cm}^{-2}$ $\mu^{-1}$ ) |
|------------------------------|-----------------------------------------------------------------|
| Hayes and Latham (1975)      | 3.39                                                            |
| Chavarría and Johnson (1975) | 3.25                                                            |
| Mitchell and Johnson (1969)  | 3.75                                                            |

our first observing run in Baja California (Chavarría and Johnson 1975). The third calibration is tentative and subject to revision, but it does agree well (4 percent) with that of Hayes and Latham. Nevertheless, we cannot arbitrarily disregard the older data and we feel that an appropriate value for  $\alpha$  Lyr at  $\lambda 5556$  Å might be about  $3.45 - 3.50 \times 10^{-12}$  watt  $\text{cm}^{-2}$   $\mu^{-1}$ . In the units of Hayes and Latham, this is  $3.45 - 3.50 \times 10^{-9}$  erg  $\text{cm}^{-2}$   $\text{s}^{-1}$  Å $^{-1}$ . This translates to about  $4.30 \times 10^{-12}$  watt  $\text{cm}^{-2}$   $\mu^{-1}$ , for mag (52) = 0.00, and this value has been entered in Table 3 as the absolute calibration for magnitude 52. We have revised slightly our older color calibration in view of the more recent work by Oke and Schild and by Hayes; the revised values are listed in Table 3. We believe that this calibration is the best available today, but we intend to continue our efforts to improve the absolute calibration. The 13 numbers in column 4 of Table 3, plus the absolute calibration for mag 52 are, of course, the 14 numbers called from CAL.DTA by the FORTRAN IV program listed in Table 5.

This work has been supported in part, over the years, by the National Aeronautics and Space Administration. Much of the reduction of the "southern" observations was done by Mitchell at the University of Texas; we are grateful for the financial support supplied by Dr. Harlan Smith during this time. The final work and the preparation of the tables and this paper for publication was done at the University of Arizona; this financial support was provided by the University of Arizona, which made available the time on the DEC SYSTEM-10 and CDC 6400 computers.

Filters which will duplicate the performance of those that we used to define the 13-color photo-

## THIRTEEN-COLOR PHOTOMETRY OF 1380 BRIGHT STARS

TABLE 7  
THIRTEEN COLOR PHOTOMETRY OF BRIGHT STARS

| B.S.  | NAME | SP. TYPE | 52         | 33-52   | 35-52  | 37-52  | 40-52  | 45-52  | 52-58  | 52-63  | 52-71  | 52-80  | 52-86  | 52-99  | 52-110 | NB     | NR    |
|-------|------|----------|------------|---------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|-------|
| 3     | 33   | PSC      | K1 III     | 4.879   | 1.674  | 1.468  | 1.578  | 1.363  | 0.451  | 0.523  | 0.831  | 1.074  | 1.304  | 1.452  | 1.604  | 1.762  | 3 2   |
| 15    | ALF  | AND      | B9 P (III) | 2.061   | -0.779 | -0.734 | -0.478 | -0.167 | -0.051 | -0.014 | -0.034 | -0.051 | -0.064 | -0.104 | -0.151 | -0.161 | 2 3   |
| 21    | BET  | CAS      | F2 IV      | 2.367   | 0.366  | 0.277  | 0.266  | 0.376  | 0.169  | 0.190  | 0.322  | 0.434  | 0.534  | 0.549  | 0.592  | 0.663  | 8 3   |
| 25    | EPS  | PHE      | K0 III     | 4.129   | 1.743  | 1.437  | 1.596  | 1.324  | 0.491  | 0.508  | 0.759  | 0.987  | 1.221  | 1.357  | 1.497  | 1.730  | 2 2   |
| 27    | 22   | AND      | F2 II      | 5.120   | 0.766  | 0.607  | 0.334  | 0.429  | 0.219  | 0.242  | 0.387  | 0.549  | 0.676  | 0.734  | 0.818  | 0.943  | 2 3   |
| 33    | 6    | CET      | F6 V       | 5.018   | 0.207  | 0.114  | 0.305  | 0.541  | 0.257  | 0.259  | 0.428  | 0.611  | 0.763  | 0.789  | 0.827  | 0.930  | 2 1   |
| 39    | GAM  | PEG      | B2 IV      | 2.794   | -1.428 | -1.322 | -0.891 | -0.312 | -0.077 | -0.069 | -0.110 | -0.179 | -0.241 | -0.316 | -0.446 | -0.486 | 10 1  |
| 45    | CHI  | PEG      | M2 III     | 5.198   | 3.527  | 2.998  | 2.944  | 2.317  | 0.691  | 0.752  | 1.269  | 1.953  | 2.452  | 2.653  | 3.001  | 3.287  | 29 18 |
| 48 V  | 7    | CET      | G1         | 4.894   | 3.575  | 3.222  | 3.146  | 2.504  | 0.771  | 0.786  | 1.311  | 1.984  | 2.475  | 2.689  | 3.023  | 3.253  | 3 1   |
| 63    | THE  | AND      | A2 V       | 4.638   | 1.057  | 0.083  | 0.079  | 0.056  | 0.020  | 0.077  | 0.056  | 0.066  | 0.118  | 0.099  | 0.126  | 0.142  | 2 2   |
| 68    | SIG  | AND      | A2 V       | 4.532   | 0.119  | 0.105  | 0.123  | 0.087  | 0.038  | 0.045  | 0.053  | 0.069  | 0.095  | 0.092  | 0.113  | 0.176  | 2 3   |
| 74    | IDT  | CET      | K2 III     | 3.855   | 2.306  | 2.068  | 2.073  | 1.702  | 0.541  | 0.577  | 0.910  | 1.193  | 1.446  | 1.591  | 1.773  | 1.960  | 3 2   |
| 77    | ZET  | TUC      | G2 V       | 4.369   | 0.380  | 0.239  | 0.463  | 0.655  | 0.316  | 0.312  | 0.490  | 0.720  | 0.885  | 0.932  | 1.040  | 0.898  | 2 2   |
| 98    | BET  | HYI      | G2 IV      | X 2.939 | 0.560  | 0.411  | 0.572  | 0.737  | 0.342  | 0.312  | 0.495  | 0.725  | 0.858  | 0.904  | 0.973  | 1.187  | 2 2   |
| 99    | ALF  | PHE      | K0 III     | X 2.686 | 1.842  | 1.515  | 1.680  | 1.407  | 0.525  | 0.567  | 0.852  | 1.155  | 1.410  | 1.529  | 1.739  | 1.962  | 2 2   |
| 100   | KAP  | PHE      | A1 VN      | X 3.983 | 0.302  | 0.175  | 0.253  | 0.177  | 0.122  | 0.112  | 0.130  | 0.201  | 0.250  | 0.230  | 0.266  | 0.339  | 2 3   |
| 105   | ETA  | SCL      | M5         | X 5.192 | 3.817  | 3.165  | 3.043  | 2.355  | 0.880  | 0.712  | 1.276  | 2.125  | 2.762  | 2.991  | 3.360  | 3.765  | 2 2   |
| 125   | LAM  | 1 PHE    | A0 V       | 4.760   | 0.049  | 0.023  | 0.053  | 0.031  | 0.020  | 0.012  | 0.006  |        |        |        |        |        | 3 0   |
| 126   | BET  | 1 TUC    | B8 V       | 4.367   | -0.331 | -0.304 | -0.158 | -0.054 | 0.004  | -0.010 | -0.024 |        |        |        |        |        | 1 0   |
| 127   | BET  | 2 TUC    | A2 V       | 4.611   | 0.075  | 0.024  | 0.136  | 0.159  | 0.056  | 0.109  | 0.172  |        |        |        |        |        | 1 0   |
| 123 D | LAM  | CAS      | B8         | 4.715   | -0.559 | -0.514 | -0.373 | -0.121 | -0.029 | -0.014 | -0.044 | -0.003 | -0.023 | -0.062 | -0.142 | -0.126 | 2 3   |
| 130   | KAP  | CAS      | B1 IA      | 4.220   | -1.043 | -0.986 | -0.582 | 0.068  | 0.142  | 0.092  | 0.164  | 0.219  | 0.271  | 0.261  | 0.218  | 0.286  | 2 3   |
| 153   | ZET  | CAS      | B2 V       | 3.685   | -1.373 | -1.246 | -0.840 | -0.269 | -0.064 | -0.052 | -0.099 | -0.149 | -0.189 | -0.252 | -0.393 | -0.432 | 2 3   |
| 154   | PI   | AND      | B5 V       | 4.368   | -0.946 | -0.864 | -0.592 | -0.180 | -0.036 | -0.014 | -0.046 | -0.058 | -0.085 | -0.139 | -0.216 | -0.190 | 2 2   |
| 163   | EPS  | AND      | G8 IIIP    | 4.560   | 1.176  | 0.932  | 1.043  | 1.077  | 0.432  | 0.415  | 0.679  | 0.938  | 1.170  | 1.257  | 1.411  | 1.576  | 2 3   |
| 165   | DEL  | AND      | K3 III     | 3.645   | 2.577  | 2.313  | 2.352  | 1.845  | 0.537  | 0.669  | 1.002  | 1.323  | 1.609  | 1.737  | 1.949  | 2.176  | 2 3   |
| 168   | ALF  | CAS      | K0 II-III  | 2.521   | 2.142  | 1.925  | 1.939  | 1.645  | 0.556  | 0.545  | 0.840  | 1.115  | 1.359  | 1.475  | 1.654  | 1.863  | 2 2   |
| 179   | XI   | CAS      | B2 V       | 4.825   | -0.985 | -0.910 | -0.621 | -0.174 | -0.027 | -0.016 | -0.018 | -0.054 | -0.077 | -0.104 | -0.166 | -0.153 | 2 2   |
| 180   | MU   | PHE      | G8 III     | X 4.822 | 1.524  | 1.274  | 1.436  | 1.248  | 0.504  | 0.479  | 0.719  | 1.007  | 1.201  | 1.283  | 1.424  | 1.657  | 2 2   |
| 188   | BET  | CET      | K1 III     | 2.354   | 1.772  | 1.556  | 1.615  | 1.388  | 0.477  | 0.516  | 0.799  | 1.042  | 1.269  | 1.395  | 1.534  | 1.687  | 2 2   |
| 191   | ETA  | PHE      | A0 V       | 4.376   | 0.010  | 0.011  | -0.057 | -0.015 | 0.018  | 0.008  | 0.002  |        |        |        |        |        | 2 0   |
| 193   | OMI  | CAS      | B2 V       | 4.586   | -0.778 | -0.722 | -0.531 | -0.102 | 0.009  | 0.036  | 0.042  | 0.030  | 0.035  | 0.017  | -0.050 | 0.033  | 2 1   |
| 194   | PHI  | CET      | K0 III     | 5.038   | 1.656  | 1.446  | 1.539  | 1.335  | 0.461  | 0.497  | 0.794  | 1.044  | 1.280  | 1.386  | 1.526  | 1.688  | 3 2   |
| 215 V | ZET  | AND      | K1 II      | 4.437   | 1.800  | 1.572  | 1.669  | 1.473  | 0.507  | 0.583  | 0.912  | 1.212  | 1.464  | 1.571  | 1.760  | 1.953  | 2 2   |
| 219 D | ETA  | CAS      | G0 V       | 3.587   | 0.307  | 0.200  | 0.428  | 0.655  | 0.275  | 0.297  | 0.520  | 0.689  | 0.847  | 0.896  | 0.991  | 1.137  | 4 2   |
| 224   | DEL  | PSC      | K5 III     | 4.868   | 3.249  | 2.816  | 2.846  | 2.230  | 0.624  | 0.782  | 1.228  | 1.652  | 2.020  | 2.190  | 2.466  | 2.744  | 2 3   |
| 226   | MU   | AND      | B5 V       | 4.535   | -0.947 | -0.874 | -0.580 | -0.181 | -0.034 | -0.045 | -0.063 | -0.126 | -0.166 | -0.263 | -0.242 |        | 3 1   |
| 236   | LAM  | HYI      | M1 III     | X 5.480 | 2.919  | 2.524  | 2.615  | 1.940  | 0.576  | 0.753  | 1.090  | 1.467  | 1.735  | 1.862  | 2.101  | 2.411  | 2 2   |
| 244   | 8    | W        | F8 V       | 4.931   | 0.387  | 0.305  | 0.464  | 0.646  | 0.281  | 0.273  | 0.465  | 0.619  | 0.774  | 0.796  | 0.860  | 0.981  | 2 3   |
| 248   | 20   | CET      | M0 III     | 5.181   | 3.430  | 2.935  | 2.933  | 2.327  | 0.674  | 0.805  | 1.263  | 1.756  | 2.132  | 2.300  | 2.593  | 2.834  | 3 3   |
| 253   | UPS  | 1 CAS    | K2 III     | 5.126   | 2.309  | 2.008  | 2.083  | 1.696  | 0.540  | 0.604  | 0.944  | 1.250  | 1.520  | 1.637  | 1.853  | 2.083  | 2 3   |
| 264 V | GAM  | CAS      | B0 IV+V    | 2.270   | -1.575 | -1.511 | -0.905 | -0.165 | 0.022  | 0.008  | 0.086  | 0.129  | 0.191  | 0.089  | -0.031 | 0.010  | 3 3   |
| 265   | UPS  | 2 CAS    | G8 III-IV  | 4.852   | 1.417  | 1.191  | 1.298  | 1.217  | 0.444  | 0.463  | 0.756  | 1.006  | 1.240  | 1.335  | 1.503  | 1.674  | 2 3   |
| 269   | MU   | AND      | A4 III     | 3.911   | 0.261  | 0.219  | 0.175  | 0.151  | 0.055  | 0.066  | 0.130  | 0.122  | 0.188  | 0.171  | 0.193  | 0.230  | 2 1   |
| 271   | ETA  | AND      | G8 III-IV  | 4.618   | 1.425  | 1.227  | 1.322  | 1.216  | 0.436  | 0.435  | 0.726  | 0.946  | 1.149  | 1.239  | 1.373  | 1.549  | 2 2   |
| 280   | ALF  | SCL      | B8 III P   | 4.302   | -0.884 | -0.832 | -0.624 | -0.195 | -0.031 | -0.036 | -0.053 |        |        |        |        |        | 2 0   |
| 285   | 3    | III      | K2 III     | 4.537   | 2.370  | 2.145  | 2.184  | 1.757  | 0.551  | 0.589  | 0.913  | 1.197  | 1.465  | 1.577  | 1.755  | 1.991  | 1 1   |
| 294   | EPS  | PSC      | K0 III     | 4.508   | 1.474  | 1.240  | 1.340  | 1.256  | 0.471  | 0.440  | 0.768  | 1.042  | 1.260  | 1.357  | 1.507  | 1.634  | 2 2   |
| 322 D | BET  | PHE      | G8 III     | X 3.527 | 1.335  | 1.088  | 1.218  | 1.132  | 0.462  | 0.453  | 0.656  | 0.877  | 1.082  | 1.181  | 1.333  | 1.509  | 3 3   |
| 334   | ETA  | CET      | K3 III     | 3.758   | 2.154  | 1.930  | 1.988  | 1.608  | 0.499  | 0.581  | 0.903  | 1.179  | 1.419  | 1.539  | 1.721  | 1.926  | 2 3   |
| 335 D | PHI  | AND      | B7 V       | 4.251   | -0.556 | -0.497 | -0.438 | -0.105 | -0.006 | 0.013  | 0.016  | -0.008 | 0.009  | 0.004  | -0.017 | 0.005  | 2 2   |
| 337   | BET  | AND      | M0 III     | 2.510   | 3.545  | 3.006  | 3.008  | 2.365  | 0.685  | 0.807  | 1.287  | 1.873  | 2.309  | 2.493  | 2.801  | 3.062  | 2 2   |
| 338 V | ZET  | PHE      | B7 V       | 4.097   | -0.759 | -0.696 | -0.431 | -0.133 | -0.024 | 0.006  | -0.036 |        |        |        |        |        | 1 0   |
| 343   | THE  | CAS      | A7 V       | 4.391   | 0.302  | 0.258  | 0.235  | 0.220  | 0.081  | 0.096  | 0.144  | 0.179  | 0.217  | 0.230  | 0.264  | 0.268  | 2 3   |
| 351   | CHI  | PSC      | G8 III     | 4.900   | 1.647  | 1.455  | 1.523  | 1.368  | 0.494  | 0.485  | 0.759  | 1.015  | 1.236  | 1.336  | 1.502  | 1.705  | 2 3   |
| 352   | TAU  | PSC      | K0 III-IV  | 4.784   | 1.872  | 1.698  | 1.761  | 1.474  | 0.492  | 0.543  | 0.850  | 1.100  | 1.343  | 1.415  | 1.599  | 1.789  | 2 2   |
| 360   | PHI  | PSC      | K0 III     | 4.925   | 1.677  | 1.493  | 1.568  | 1.410  | 0.483  | 0.494  | 0.766  | 1.044  | 1.265  | 1.366  | 1.522  | 1.670  | 2 3   |
| 370   | UPS  | PHE      | F8 V       | 5.095   | 0.408  | 0.320  | 0.523  | 0.653  | 0.282  | 0.304  | 0.483  |        |        |        |        |        | 1 0   |
| 383   | UPS  | PSC      | A3 V       | 4.797   | 0.202  | 0.184  | 0.056  | 0.030  | 0.017  | 0.048  | 0.044  | 0.098  | 0.114  | 0.127  | 0.138  | 0.151  | 2 2   |
| 390   | XI   | AND      | K0 III-IV  | 5.143   | 1.900  | 1.698  | 1.760  | 1.474  | 0.485  | 0.824  | 0.807  | 1.074  | 1.254  | 1.399  | 1.574  | 1.798  | 2 2   |
| 399   | PSI  | CAS      | K0 III     | 5.005   | 1.761  | 1.592  | 1.675  | 1.422  | 0.473  | 0.527  | 0.815  | 1.055  | 1.287  | 1.394  | 1.546  | 1.746  | 2 3   |
| 402   | THE  | CET      | K0 III     | 3.921   | 1.789  | 1.596  | 1.666  | 1.414  | 0.481  | 0.527  | 0.839  | 1.058  | 1.308  | 1.426  | 1.592  | 1.779  | 2 2   |
| 403 V | DEL  | CAS      | A5 V       | 2.690   | 0.289  | 0.252  | 0.193  | 0.148  | 0.059  | 0.084  | 0.105  | 0.172  | 0.223  | 0.225  | 0.244  | 0.299  | 3 3   |
| 417   | DMG  | AND      | F4 IV      | 4.937   | 0.181  | 0.116  | 0.282  | 0.493  | 0.214  | 0.223  | 0.377  | 0.522  | 0.637  | 0.650  | 0.715  | 0.819  | 2 2   |
| 424 V | ALF  | UMI      | F8 IB      | 2.120   | 0.941  | 0.748  | 0.617  | 0.710  | 0.283  | 0.318  | 0.487  | 0.632  | 0.808  | 0.867  | 0.920  | 1.025  | 3 3   |
| 429   | GAM  | PHE      | K5 II      | X 3.885 | 3.459  | 2.920  | 2.977  | 2.294  | 0.721  | 0.841  | 1.255  | 1.708  | 2.106  | 2.322  | 2.655  | 2.935  | 2 2   |
| 434   | MU   | PSC      | K4 III     | 5.232   | 2.858  | 2.412  | 2.485  | 1.964  | 0.581  | 0.721  | 1.123  | 1.508  | 1.839  | 1.978  | 2.238  | 2.490  | 2 2   |
| 437   | ETA  | PSC      | G8 III     | 3.849   | 1.507  | 1.323  | 1.370  | 1.264  | 0.456  | 0.442  | 0.730  | 0.956  | 1.164  | 1.266  | 1.406  | 1.565  | 2 3   |
| 440   | DEL  | PHE      | K0 III-IV  | X 4.181 | 1.542  | 1.253  | 1.407  | 1.249  | 0.480  | 0.477  | 0.741  | 1.015  | 1.232  | 1.323  | 1.488  | 1.756  | 2 2   |
| 442   | CHI  | CAS      | G8 III     | 4.915   | 1.557  | 1.338  | 1.426  | 1.296  | 0.465  | 0.466  | 0.755  | 1.005  | 1.250  | 1.341  | 1.489  | 1.660  | 2 3   |
| 458   | UPS  | AND      | F8 V       | 4.226   | 0.300  | 0.211  | 0.374  | 0.596  | 0.252  | 0.279  | 0.444  | 0.624  | 0.764  | 0.795  | 0.848  | 0.949  | 4 3   |
| 464   | 51   | AND      | K3 III     | 3.927   | 2.491  | 2.250  | 2.285  | 1.820  | 0.534  | 0.651  | 1.000  | 1      |        |        |        |        |       |

TABLE 7 (CONTINUED)

| B.S.   | NAME  | SP. | TYPE         |   | 52    | 33-52  | 35-52  | 37-52  | 40-52  | 45-52  | 52-58  | 52-63  | 52-72  | 52-80  | 52-86  | 52-99  | 52-11C | NB | NR |
|--------|-------|-----|--------------|---|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|----|----|
| 570    | ETA 2 | HYI | G8 III       | X | 4.918 | 1.427  | 1.126  | 1.297  | 1.185  | 0.495  | 0.488  | 0.745  | 0.960  | 1.196  | 1.276  | 1.440  | 1.682  | 1  | 2  |
| 575    | 48    | CAS | A4 V         |   | 4.518 | 0.208  | 0.155  | 0.192  | 0.203  | 0.076  | 0.080  | 0.130  | 0.184  | 0.235  | 0.249  | 0.263  | 0.301  | 2  | 4  |
| 580    | 50    | CAS | A1 V         |   | 3.962 | 0.088  | 0.054  | 0.011  | -0.011 | -0.002 | 0.032  | 0.027  | 0.034  | 0.044  | 0.029  | 0.047  | 0.083  | 2  | 3  |
| 585    | UPS   | CET | M1 III       | X | 4.460 | 3.550  | 3.004  | 3.032  | 2.311  | 1.704  | 0.807  | 1.240  | 1.795  | 2.195  | 2.390  | 2.715  | 3.000  | 2  | 2  |
| 590    | 4     | PER | B8 V         |   | 4.994 | -0.440 | -0.429 | -0.419 | -0.118 | -0.007 | 0.002  | 0.000  | 0.023  | 0.027  | 0.035  | -0.034 | -0.024 | 2  | 3  |
| 591    | ALF   | HYI | F0 V         | X | 2.943 | 0.484  | 0.322  | 0.322  | 0.354  | 0.178  | 0.177  | 0.218  | 0.331  | 0.402  | 0.423  | 0.483  | 0.591  | 2  | 2  |
| 603/4  | GAM   | AND | K3 II+A      |   | 2.417 | 1.745  | 1.620  | 1.733  | 1.554  | 0.552  | 0.615  | 0.924  |        |        |        |        |        | 2  | 0  |
| 612    | UPS   | FOR | A0 III(V) SI |   | 4.677 | -0.873 | -0.811 | -0.565 | -0.207 | -0.047 | -0.049 | -0.080 |        |        |        |        |        | 1  | 0  |
| 617    | ALF   | ARI | K2 III       |   | 2.315 | 2.065  | 1.802  | 1.903  | 1.576  | 0.506  | 0.561  | 0.885  | 1.181  | 1.441  | 1.571  | 1.754  | 1.963  | 63 | 42 |
| 618    |       |     | A1 IA        |   | 5.806 | 0.535  | 0.356  | 0.207  | 0.585  | 0.362  | 0.349  | 0.594  | 0.812  | 1.031  | 1.165  | 1.339  | 1.473  | 2  | 2  |
| 620    | 58    | AND | A4 V         |   | 4.830 | 0.258  | 0.210  | 0.161  | 0.125  | 0.048  | 0.069  | 0.107  | 0.133  | 0.187  | 0.188  | 0.207  | 0.238  | 2  | 4  |
| 622    | BET   | TRI | A5 III       |   | 3.071 | 0.297  | 0.248  | 0.176  | 0.164  | 0.062  | 0.083  | 0.131  | 0.174  | 0.220  | 0.225  | 0.248  | 0.322  | 2  | 2  |
| 638    | 19    | ARI | M0 III       |   | 6.160 | 3.423  | 2.965  | 2.938  | 2.310  | 0.659  | 0.806  | 1.279  | 1.808  | 2.240  | 2.429  | 2.730  | 3.022  | 2  | 2  |
| 649    | XI 1  | CET | G8 II        |   | 4.581 | 1.360  | 1.099  | 1.171  | 1.144  | 0.437  | 0.417  | 0.687  | 0.907  | 1.118  | 1.204  | 1.339  | 1.513  | 2  | 2  |
| 664    | GAM   | TRI | A0 V         |   | 4.040 | 0.004  | 0.000  | 0.025  | 0.017  | 0.002  | 0.031  | 0.018  | 0.024  | 0.038  | 0.041  | 0.053  | 0.072  | 2  | 2  |
| 674    | PHI   | ERI | B8 V         | X | 3.565 | -0.609 | -0.631 | -0.412 | -0.160 | 0.001  | 0.003  | -0.062 | -0.094 | -0.101 | -0.134 | -0.190 | -0.164 | 2  | 2  |
| 681 V. | OMI   | CET | M6 E         |   | 3.397 | 3.152  | 2.103  | 1.733  | 1.615  | 1.118  | 0.358  | 1.267  | 2.929  | 3.773  | 4.167  | 4.673  | 4.987  | 1  | 1  |
| 696    | 10    | PER | B2 IA        |   | 6.339 | -0.675 | -0.658 | -0.336 | 0.242  | 0.234  | 0.188  | 0.311  | 0.393  | 0.529  | 0.586  | 0.609  | 0.540  | 2  | 2  |
| 699    | 65    | AND | K4 III       |   | 5.161 | 3.297  | 2.879  | 2.931  | 2.281  | 0.661  | 0.795  | 1.231  | 1.713  | 2.075  | 2.228  | 2.519  | 2.811  | 3  | 2  |
| 707 D  | 10T   | CAS | A5P          |   | 4.513 | 0.109  | 0.065  | 0.146  | 0.151  | 0.041  | 0.110  | 0.143  | 0.189  | 0.280  | 0.254  | 0.260  | 0.331  | 2  | 3  |
| 708    | RHO   | CET | B9 V         |   | 4.871 | -0.035 | -0.030 | -0.127 | -0.042 | 0.004  | -0.001 | 0.008  | -0.024 | -0.018 | 0.007  | -0.001 | 0.004  | 2  | 2  |
| 718    | XI 2  | CET | B9 III       |   | 4.284 | -0.204 | -0.185 | -0.139 | -0.066 | -0.015 | -0.006 | -0.023 | -0.031 | -0.040 | -0.059 | -0.067 | -0.067 | 56 | 31 |
| 740    | SIG   | CET | F5 IV-V      |   | 4.830 | 0.242  | 0.173  | 0.297  | 0.502  | 0.249  | 0.237  | 0.400  | 0.526  | 0.656  | 0.707  | 0.727  | 0.866  | 2  | 2  |
| 749    | OME   | FOR | B9           |   | 4.874 | -0.182 | -0.159 | -0.152 | -0.051 | 0.008  | -0.030 | -0.034 |        |        |        |        |        | 1  | 0  |
| 753    |       |     | K3 V         |   | 6.138 | 1.369  | 1.176  | 1.479  | 1.210  | 0.298  | 0.605  | 0.908  | 1.180  | 1.410  | 1.512  | 1.666  | 1.669  | 6  | 18 |
| 779    | DEL   | CET | B2 IV        |   | 4.059 | -1.448 | -1.338 | -0.912 | -0.319 | -0.082 | -0.085 | -0.135 | -0.166 | -0.238 | -0.298 | -0.435 | -0.450 | 3  | 1  |
| 788    | 12    | PER | A2 V         |   | 5.034 | 0.429  | 0.326  | 0.497  | 0.661  | 0.261  | 0.283  | 0.459  | 0.615  | 0.759  | 0.796  | 0.865  | 1.005  | 2  | 2  |
| 789    |       |     | A2 V         |   | 4.745 | 0.081  | 0.065  | 0.124  | 0.088  | 0.047  | 0.025  | 0.037  |        |        |        |        |        | 1  | 0  |
| 794    | 10T   | ERI | K0 III       | X | 4.354 | 1.620  | 1.320  | 1.475  | 1.310  | 0.496  | 0.498  | 0.776  | 1.078  | 1.306  | 1.401  | 1.621  | 1.819  | 2  | 2  |
| 799    | THE   | PER | F7 V         |   | 4.251 | 0.230  | 0.157  | 0.341  | 0.559  | 0.237  | 0.254  | 0.434  | 0.555  | 0.715  | 0.736  | 0.808  | 0.916  | 2  | 3  |
| 801    | 35    | ARI | B3 V         |   | 4.659 | -1.067 | -0.954 | -0.627 | -0.179 | -0.035 | -0.038 | -0.057 | -0.111 | -0.118 | -0.185 | -0.246 | -0.229 | 2  | 2  |
| 804 D  | GAM   | CET | A2 V         |   | 3.506 | 0.112  | 0.083  | 0.131  | 0.109  | 0.029  | 0.060  | 0.093  | 0.114  | 0.156  | 0.161  | 0.184  | 0.188  | 2  | 2  |
| 811    | PI    | CET | B7 V         |   | 4.245 | -0.733 | -0.675 | -0.498 | -0.175 | -0.041 | -0.012 | -0.034 | -0.074 | -0.109 | -0.151 | -0.180 | -0.384 | 2  | 2  |
| 813    | MU    | CET | F0 IV        |   | 4.353 | 0.280  | 0.219  | 0.273  | 0.344  | 0.141  | 0.187  | 0.291  | 0.368  | 0.446  | 0.477  | 0.510  | 0.589  | 2  | 2  |
| 818    | TAU 1 | ERI | F6 V         |   | 4.568 | 0.231  | 0.187  | 0.364  | 0.557  | 0.245  | 0.260  | 0.415  | 0.568  | 0.689  | 0.741  | 0.756  | 0.842  | 2  | 2  |
| 824    | 39    | ARI | K1 III       |   | 4.802 | 1.997  | 1.798  | 1.861  | 1.535  | 0.510  | 0.550  | 0.843  | 1.132  | 1.364  | 1.487  | 1.660  | 1.855  | 2  | 3  |
| 834    | ETA   | PER | K3 III       |   | 4.244 | 3.317  | 2.952  | 2.892  | 2.393  | 0.800  | 0.834  | 1.294  | 1.675  | 2.059  | 2.238  | 2.540  | 2.829  | 2  | 3  |
| 838    | 41    | ARI | B8 V         |   | 3.625 | -0.615 | -0.562 | -0.389 | -0.133 | -0.037 | -0.014 | -0.034 | -0.075 | -0.123 | -0.115 | -0.166 | -0.143 | 2  | 2  |
| 840    | 16    | PER | F2 III       |   | 4.320 | 0.398  | 0.306  | 0.300  | 0.412  | 0.194  | 0.187  | 0.316  | 0.397  | 0.513  | 0.546  | 0.587  | 0.654  | 2  | 2  |
| 841    | BET   | FOR | G6 III       | X | 4.688 | 1.550  | 1.283  | 1.403  | 1.278  | 0.498  | 0.473  | 0.732  | 0.980  | 1.211  | 1.334  | 1.488  | 1.739  | 2  | 2  |
| 843    | 17    | PER | K5 III       |   | 4.982 | 3.432  | 2.937  | 2.965  | 2.320  | 0.679  | 0.794  | 1.258  | 1.777  | 2.218  | 2.381  | 2.675  | 2.968  | 2  | 2  |
| 854    | TAU   | PER | G4 III+A4 V  |   | 4.143 | 1.030  | 0.904  | 0.946  | 0.900  | 0.358  | 0.378  | 0.629  | 0.810  | 1.060  | 1.133  | 1.251  | 1.406  | 2  | 2  |
| 872    | UPS   | HYI | K4 III       | X | 5.150 | 2.645  | 2.313  | 2.472  | 1.878  | 0.578  | 0.731  | 1.069  | 1.353  | 1.649  | 1.770  | 1.987  | 2.225  | 2  | 1  |
| 874    | ETA   | ERI | K1 III-IV    |   | 4.161 | 1.888  | 1.664  | 1.765  | 1.465  | 0.486  | 0.526  | 0.842  | 1.102  | 1.346  | 1.452  | 1.628  | 1.618  | 2  | 2  |
| 875    |       |     | A1 V         |   | 5.196 | 0.182  | 0.154  | 0.109  | 0.103  | 0.041  | 0.052  | 0.079  | 0.117  | 0.151  | 0.151  | 0.165  | 0.220  | 26 | 19 |
| 879    | PI    | PER | A2 V         |   | 4.703 | 0.220  | 0.201  | 0.075  | 0.057  | 0.033  | 0.048  | 0.076  | 0.099  | 0.134  | 0.129  | 0.164  | 0.223  | 2  | 2  |
| 882    | 24    | PER | K2 III       |   | 5.253 | 2.344  | 2.052  | 2.136  | 1.720  | 0.533  | 0.602  | 0.956  | 1.223  | 1.525  | 1.640  | 1.858  | 2.061  | 2  | 2  |
| 886    | LAM   | CET | B5 III       |   | 4.690 | -0.764 | -0.699 | -0.487 | -0.171 | -0.042 | -0.002 | -0.027 | -0.036 | -0.049 | -0.075 | -0.136 | -0.118 | 2  | 3  |
| 897/8  | THE 1 | ERI | A3 V         | X | 2.941 | 0.363  | 0.291  | 0.186  | 0.179  | 0.107  | 0.082  | 0.093  | 0.137  | 0.152  | 0.166  | 0.218  | 0.298  | 2  | 2  |
| 911    | ALF   | CET | M2 III       |   | 2.951 | 3.585  | 3.073  | 2.965  | 2.436  | 0.751  | 0.766  | 1.285  | 1.969  | 2.462  | 2.671  | 3.020  | 3.307  | 2  | 2  |
| 915    | GAM   | PER | G8 III+*A3:  |   | 3.104 | 1.003  | 0.899  | 0.895  | 0.832  | 0.350  | 0.362  | 0.587  | 0.819  | 1.025  | 1.107  | 1.251  | 1.442  | 2  | 2  |
| 919    | TAU 3 | ARI | A4 V         | X | 4.130 | 0.263  | 0.188  | 0.209  | 0.202  | 0.097  | 0.103  | 0.131  | 0.192  | 0.241  | 0.265  | 0.306  | 0.344  | 2  | 2  |
| 921 V  | RHO   | PER | M4 IIIA      |   | 3.740 | 3.812  | 3.082  | 2.858  | 2.267  | 0.926  | 0.574  | 1.289  | 2.407  | 3.117  | 3.396  | 3.882  | 4.205  | 2  | 3  |
| 932    |       |     | A0 V         |   | 4.869 | 0.064  | 0.058  | 0.066  | 0.049  | 0.024  | 0.037  | 0.034  | 0.049  | 0.064  | 0.048  | 0.064  | 0.164  | 3  | 2  |
| 936 V  | BET   | PER | B8 V         |   | 2.159 | -0.579 | -0.542 | -0.358 | -0.113 | -0.036 | 0.017  | 0.037  | 0.057  | 0.097  | 0.093  | 0.082  | 0.149  | 1  | 3  |
| 937    | 10T   | PER | G0 V         |   | 4.185 | 0.457  | 0.357  | 0.536  | 0.704  | 0.286  | 0.300  | 0.503  | 0.670  | 0.836  | 0.870  | 0.945  | 1.070  | 12 | 2  |
| 941    | KAP   | PER | K0 III       |   | 4.053 | 1.557  | 1.401  | 1.487  | 1.285  | 0.424  | 0.493  | 0.778  | 0.993  | 1.227  | 1.323  | 1.481  | 1.667  | 2  | 2  |
| 947    | DMG   | PER | K0 III       |   | 4.896 | 1.958  | 1.746  | 1.812  | 1.535  | 0.508  | 0.535  | 0.848  | 1.128  | 1.359  | 1.469  | 1.645  | 1.869  | 2  | 2  |
| 951    | DEL   | ARI | K2 III       |   | 4.595 | 1.737  | 1.559  | 1.625  | 1.328  | 0.486  | 0.488  | 0.775  | 1.000  | 1.256  | 1.361  | 1.522  | 1.702  | 2  | 2  |
| 963    | ALF   | FOR | F8 IV        | X | 3.969 | 0.212  | 0.086  | 0.333  | 0.505  | 0.253  | 0.274  | 0.451  | 0.608  | 0.718  | 0.777  | 0.841  | 1.038  | 2  | 2  |
| 972    | ZET   | ARI | A0 IV        |   | 4.894 | 0.005  | 0.001  | -0.043 | -0.034 | -0.005 | 0.014  | 0.005  | 0.043  | 0.027  | 0.031  | 0.047  | 0.088  | 2  | 2  |
| 984    | ZET   | ARI | A7M          |   | 4.875 | 0.233  | 0.184  | 0.206  | 0.269  | 0.101  | 0.144  | 0.214  | 0.266  | 0.333  | 0.354  | 0.372  | 0.496  | 2  | 2  |
| 985    |       |     | B2 VE        |   | 4.841 | -1.196 | -1.109 | -0.736 | -0.210 | -0.036 | -0.026 | -0.058 | -0.063 | -0.096 | -0.137 | -0.232 | -0.222 | 2  | 2  |
| 991    |       |     | K2 II        |   | 5.201 | 2.860  | 2.545  | 2.577  | 2.087  | 0.708  | 0.723  | 1.085  | 1.467  | 1.777  | 1.940  | 2.215  | 2.503  | 2  | 2  |
| 996    | KAP   | CET | G5 V         |   | 5.008 | 0.538  | 0.459  | 0.680  | 0.803  | 0.311  | 0.358  | 0.554  | 0.767  | 0.928  | 0.984  | 1.075  | 1.221  | 2  | 2  |
| 999    |       |     | K4 III       |   | 4.906 | 3.296  | 2.884  | 2.891  | 2.319  | 0.712  | 0.809  | 1.248  | 1.676  | 2.028  | 2.189  | 2.524  | 2.818  | 2  | 3  |
| 1002   | 32    | PER | A3 V         |   | 4.991 | 0.102  | 0.099  | 0.123  | 0.085  | 0.033  | 0.035  | 0.043  | 0.086  | 0.122  | 0.112  | 0.138  | 0.131  | 2  | 3  |
| 1003   | TAU 4 | ERI | G3           | X | 4.030 | 3.667  | 2.998  | 2.902  | 2.254  | 0      |        |        |        |        |        |        |        |    |    |

## THIRTEEN-COLOR PHOTOMETRY OF 1380 BRIGHT STARS

TABLE 7 (CONTINUED)

| B.S.    | NAME | SP. TYPE | 52    | 33-52  | 35-52  | 37-52  | 40-52  | 45-52  | 52-58  | 52-63  | 52-72  | 52-80  | 52-86  | 52-99  | 52-110 | NB | NR |
|---------|------|----------|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|----|----|
| 1138    |      | AM       | 5.424 | 0.205  | 0.166  | 0.132  | 0.118  | 0.025  | 0.054  | 0.079  | 0.101  | 0.101  | 0.088  | 0.114  | 0.131  | 2  | 2  |
| 1140    | 16   | TAU      | 5.487 | -0.576 | -0.524 | -0.351 | -0.077 | -0.013 | 0.014  | -0.003 | 0.013  | 0.009  | -0.010 | 0.011  | 0.044  | 1  | 2  |
| 1142    | 17   | TAU      | 3.709 | -0.665 | -0.609 | -0.498 | -0.160 | -0.020 | -0.013 | -0.030 | -0.042 | -0.071 | -0.046 | -0.133 | -0.091 | 3  | 2  |
| 1143    |      | GK2      | 4.901 | 2.182  | 1.934  | 2.097  | 1.586  | 0.501  | 0.613  | 0.925  | 1.204  | 1.452  | 1.578  | 1.778  | 2.032  | 2  | 2  |
| 1144    | 18   | TAU      | 5.651 | -0.605 | -0.556 | -0.373 | -0.112 | 0.009  | 0.005  | -0.008 | -0.043 | -0.041 | -0.092 | -0.098 | 0.016  | 2  | 2  |
| 1145    | 19   | TAU      | 4.309 | -0.767 | -0.713 | -0.496 | -0.174 | -0.038 | 0.005  | -0.011 | -0.035 | -0.046 | -0.079 | -0.104 | -0.107 | 3  | 2  |
| 1148    | GAM  | CAM      | 4.645 | 0.232  | 0.199  | -0.006 | 0.037  | 0.038  | 0.054  | 0.084  | 0.096  | 0.115  | 0.136  | 0.165  | 0.136  | 2  | 3  |
| 1149    | 20   | TAU      | 3.888 | -0.622 | -0.599 | -0.467 | -0.141 | -0.006 | 0.025  | 0.032  | 0.034  | 0.014  | 0.018  | -0.022 | 0.008  | 2  | 3  |
| 1151    | 21   | TAU      | 5.775 | -0.402 | -0.367 | -0.249 | -0.070 | -0.001 | 0.015  | 0.020  | -0.026 | -0.011 | -0.006 | -0.012 | 0.065  | 2  | 3  |
| 1155 V  |      | M2 IIA   | 4.909 | 4.139  | 3.557  | 3.368  | 2.728  | 0.979  | 0.831  | 1.375  | 2.345  | 2.963  | 3.215  | 3.648  | 3.970  | 2  | 2  |
| 1156    | 23   | TAU      | 4.184 | -0.661 | -0.615 | -0.473 | -0.080 | 0.000  | 0.012  | 0.053  | 0.033  | 0.064  | 0.045  | -0.024 | 0.035  | 3  | 2  |
| 1162    | PI   | ERI      | 4.868 | 3.648  | 3.091  | 3.102  | 2.430  | 0.714  | 0.787  | 1.289  | 1.883  | 2.347  | 2.558  | 2.869  | 3.160  | 2  | 2  |
| 1165    | ETA  | TAU      | 2.875 | -0.562 | -0.521 | -0.499 | -0.151 | -0.011 | -0.012 | 0.006  | -0.007 | -0.054 | -0.019 | -0.056 | -0.058 | 5  | 2  |
| 1172    |      | K8 V     | 5.445 | -0.532 | -0.494 | -0.387 | -0.118 | -0.009 | -0.003 | -0.016 | -0.044 | -0.044 | -0.063 | -0.087 | -0.004 | 3  | 3  |
| 1175    | BET  | RET      | 4.152 | 2.026  | 1.719  | 1.868  | 1.515  | 0.531  | 0.593  | 0.880  | 1.161  | 1.415  | 1.564  | 1.733  | 2.020  | 1  | 2  |
| 1178    | 27   | TAU      | 3.638 | -0.569 | -0.536 | -0.465 | -0.134 | -0.014 | 0.000  | -0.002 | -0.002 | -0.007 | -0.020 | -0.078 | -0.067 | 3  | 3  |
| 1180 V  | 28   | TAU      | 5.007 | -0.696 | -0.648 | -0.462 | -0.123 | -0.004 | -0.007 | 0.015  | -0.020 | -0.013 | -0.032 | -0.086 | -0.042 | 3  | 3  |
| 1183    |      | B9 V     | 6.214 | -0.367 | -0.316 | -0.249 | -0.117 | -0.054 | -0.004 | 0.005  | -0.042 | -0.064 | -0.059 | -0.081 | 0.133  | 1  | 2  |
| 1195    |      | G5 III   | 4.390 | 1.380  | 1.121  | 1.319  | 1.143  | 0.446  | 0.460  | 0.710  | 0.898  | 1.124  | 1.241  | 1.358  | 1.634  | 2  | 2  |
| 1203    | ZET  | PER      | 2.927 | -1.003 | -0.964 | -0.569 | 0.045  | 0.127  | 0.083  | 0.162  | 0.220  | 0.280  | 0.279  | 0.224  | 0.281  | 2  | 2  |
| 1204    |      | B9 V     | 4.947 | -0.304 | -0.284 | -0.257 | -0.109 | -0.011 | -0.013 | -0.018 | -0.037 | -0.037 | -0.048 | -0.074 | -0.046 | 2  | 2  |
| 1208    | GAM  | HYI      | 3.709 | 3.510  | 2.931  | 2.980  | 2.306  | 0.737  | 0.819  | 1.308  | 1.899  | 2.377  | 2.591  | 2.944  | 3.286  | 1  | 2  |
| 1211/2  | 32   | ERI      | 4.649 | 0.922  | 0.796  | 0.865  | 0.811  | 0.337  | 0.346  | 0.585  | 0.753  | 0.956  | 1.028  | 1.149  | 1.307  | 2  | 3  |
| 1220    | EPS  | RET      | 2.877 | -1.544 | -1.441 | -0.938 | -0.266 | -0.043 | -0.048 | -0.080 | -0.124 | -0.163 | -0.217 | -0.351 | -0.372 | 2  | 2  |
| 1228    | XI   | PER      | 4.075 | -1.321 | -1.257 | -0.755 | -0.075 | 0.052  | 0.079  | 0.124  | 0.154  | 0.189  | 0.174  | 0.093  | 0.139  | 2  | 2  |
| 1231    | GAM  | ERI      | 3.383 | 3.466  | 2.947  | 2.971  | 2.338  | 0.668  | 0.821  | 1.262  | 1.836  | 2.263  | 2.449  | 2.741  | 3.021  | 2  | 2  |
| 1239 V. | LAM  | TAU      | 3.428 | -1.006 | -0.914 | -0.617 | -0.187 | -0.051 | -0.026 | -0.023 | -0.075 | -0.068 | -0.104 | -0.161 | -0.161 | 1  | 2  |
| 1247    | DEL  | RET      | 5.020 | 3.641  | 2.998  | 2.962  | 2.346  | 0.738  | 0.834  | 1.301  | 1.866  | 2.321  | 2.535  | 2.859  | 3.246  | 1  | 2  |
| 1251    | MU   | TAU      | 3.877 | 0.048  | 0.044  | 0.041  | 0.024  | 0.005  | 0.020  | 0.029  | 0.032  | 0.043  | 0.029  | 0.058  | 0.167  | 3  | 2  |
| 1256    | 37   | TAU      | 4.643 | 2.074  | 1.791  | 1.604  | 1.463  | 0.475  | 0.548  | 0.825  | 1.099  | 1.335  | 1.435  | 1.610  | 1.826  | 2  | 2  |
| 1261    | LAM  | PER      | 4.322 | -0.009 | -0.013 | -0.208 | -0.075 | -0.010 | 0.021  | 0.006  | 0.018  | 0.019  | 0.076  | 0.084  | 0.138  | 2  | 2  |
| 1264    | GAM  | RET      | 4.877 | 3.691  | 3.109  | 2.911  | 2.299  | 0.890  | 0.706  | 1.314  | 2.252  | 2.913  | 3.179  | 3.595  | 4.007  | 1  | 2  |
| 1266    | DOT  | RET      | 5.380 | 2.942  | 2.476  | 2.654  | 2.026  | 0.603  | 0.766  | 1.139  | 1.486  | 1.779  | 1.946  | 2.171  | 2.454  | 1  | 2  |
| 1273    | 48   | PER      | 4.084 | -0.844 | -0.799 | -0.526 | -0.079 | 0.036  | 0.020  | 0.088  | 0.051  | 0.102  | 0.105  | 0.037  | 0.092  | 3  | 3  |
| 1298    | OMI  | 1 ERI    | 4.150 | 0.392  | 0.315  | 0.307  | 0.388  | 0.171  | 0.181  | 0.300  | 0.369  | 0.467  | 0.498  | 0.532  | 0.657  | 2  | 3  |
| 1302    | DEL  | HOR      | 5.013 | 0.374  | 0.290  | 0.226  | 0.388  | 0.180  | 0.188  | 0.303  |        |        |        |        |        | 1  | 0  |
| 1303    | MU   | PER      | 4.397 | 1.479  | 1.237  | 1.226  | 1.201  | 0.493  | 0.466  | 0.762  | 1.010  | 1.244  | 1.347  | 1.512  | 1.699  | 2  | 2  |
| 1306    | 52   | PER      | 4.923 | 1.414  | 1.286  | 1.325  | 1.230  | 0.489  | 0.488  | 0.780  | 1.074  | 1.301  | 1.404  | 1.586  | 1.758  | 2  | 2  |
| 1311 D  | 47   | TAU      | 5.025 | 1.141  | 0.979  | 1.017  | 1.016  | 0.398  | 0.386  | 0.644  | 0.862  | 1.064  | 1.150  | 1.283  | 1.461  | 2  | 2  |
| 1318 D  | 39   | ERI      | 5.167 | 2.169  | 1.935  | 1.997  | 1.621  | 0.511  | 0.570  | 0.914  | 1.190  | 1.429  | 1.543  | 1.726  | 1.943  | 2  | 2  |
| 1319    | 48   | TAU      | 6.405 | 0.214  | 0.130  | 0.279  | 0.451  | 0.181  | 0.226  | 0.362  | 0.488  | 0.573  | 0.620  | 0.664  | 0.764  | 1  | 3  |
| 1320    | MU   | TAU      | 4.325 | -0.882 | -0.799 | -0.532 | -0.105 | -0.002 | 0.008  | 0.011  | 0.019  | 0.015  | -0.015 | -0.059 | -0.047 | 1  | 2  |
| 1324    | B    | PER      | 4.623 | 0.116  | 0.112  | 0.042  | 0.048  | 0.037  | 0.039  | 0.060  | 0.111  | 0.122  | 0.120  | 0.143  | 0.168  | 2  | 2  |
| 1325    | OMI  | 2 ERI    | 4.645 | 0.908  | 0.756  | 1.036  | 0.986  | 0.339  | 0.434  | 0.701  | 0.918  | 1.140  | 1.208  | 1.336  | 1.474  | 2  | 2  |
| 1326    | ALF  | HOR      | 4.146 | 1.915  | 1.597  | 1.789  | 1.408  | 0.501  | 0.566  | 0.864  | 1.083  | 1.289  | 1.414  | 1.570  | 1.809  | 1  | 2  |
| 1329    | DMG  | TAU      | 4.987 | 0.220  | 0.168  | 0.245  | 0.317  | 0.122  | 0.149  | 0.220  | 0.291  | 0.365  | 0.372  | 0.364  | 0.467  | 2  | 2  |
| 1336    | ALF  | RET      | 3.564 | 1.394  | 1.120  | 1.287  | 1.148  | 0.454  | 0.447  | 0.680  | 0.859  | 1.081  | 1.197  | 1.326  | 1.536  | 2  | 2  |
| 1346    | GAM  | TAU      | 3.868 | 1.531  | 1.371  | 1.445  | 1.292  | 0.453  | 0.460  | 0.743  | 0.981  | 1.200  | 1.290  | 1.436  | 1.601  | 2  | 2  |
| 1347    | 41   | ERI      | 3.565 | -0.692 | -0.682 | -0.428 | -0.204 | -0.039 | 0.018  | -0.005 | -0.027 | -0.053 | -0.031 | -0.097 | -0.140 | 1  | 3  |
| 1350    | 53   | PER      | 4.875 | -0.819 | -0.746 | -0.476 | -0.087 | 0.023  | 0.026  | 0.053  | 0.018  | 0.034  | 0.000  | -0.041 | -0.009 | 2  | 3  |
| 1351    | 57   | TAU      | 5.656 | 0.302  | 0.211  | 0.254  | 0.339  | 0.129  | 0.155  | 0.258  | 0.359  | 0.430  | 0.433  | 0.466  | 0.542  | 2  | 4  |
| 1356    | 56   | TAU      | 5.338 | 0.254  | 0.193  | 0.230  | 0.264  | 0.100  | 0.139  | 0.215  | 0.283  | 0.334  | 0.345  | 0.367  | 0.413  | 2  | 2  |
| 1373    | DEL  | TAU      | 3.997 | 1.584  | 1.422  | 1.488  | 1.308  | 0.456  | 0.472  | 0.749  | 0.980  | 1.190  | 1.278  | 1.421  | 1.580  | 2  | 2  |
| 1376    | 63   | TAU      | 5.724 | 0.317  | 0.244  | 0.312  | 0.378  | 0.127  | 0.173  | 0.257  | 0.329  | 0.399  | 0.418  | 0.442  | 0.425  | 1  | 2  |
| 1380    | 64   | TAU      | 4.861 | 0.265  | 0.220  | 0.221  | 0.205  | 0.077  | 0.109  | 0.156  | 0.227  | 0.269  | 0.264  | 0.311  | 0.341  | 2  | 2  |
| 1385    |      | F4 VN    | 6.089 | 0.250  | 0.178  | 0.290  | 0.427  | 0.188  | 0.206  | 0.337  | 0.463  | 0.559  | 0.579  | 0.670  | 0.703  | 1  | 2  |
| 1387    | KAP  | TAU      | 4.288 | 0.281  | 0.229  | 0.202  | 0.172  | 0.054  | 0.105  | 0.152  | 0.183  | 0.233  | 0.236  | 0.261  | 0.302  | 2  | 2  |
| 1389    | 68   | TAU      | 4.320 | 0.101  | 0.074  | 0.085  | 0.069  | 0.014  | 0.048  | 0.061  | 0.070  | 0.093  | 0.078  | 0.103  | 0.116  | 2  | 2  |
| 1392    | UPS  | TAU      | 4.384 | 0.408  | 0.307  | 0.237  | 0.292  | 0.126  | 0.179  | 0.276  | 0.368  | 0.434  | 0.465  | 0.509  | 0.599  | 2  | 2  |
| 1393    | 43   | ERI      | 4.379 | 3.191  | 2.720  | 2.242  | 2.199  | 0.644  | 0.765  | 1.161  | 1.559  | 1.917  | 2.064  | 2.351  | 2.625  | 1  | 2  |
| 1394    | 71   | TAU      | 4.565 | 0.356  | 0.265  | 0.239  | 0.274  | 0.119  | 0.162  | 0.251  | 0.316  | 0.403  | 0.428  | 0.472  | 0.522  | 2  | 2  |
| 1396    | PI   | TAU      | 4.918 | 1.571  | 1.310  | 1.365  | 1.278  | 0.473  | 0.465  | 0.738  | 1.006  | 1.229  | 1.337  | 1.494  | 1.652  | 2  | 2  |
| 1408    | 76   | TAU      | 5.966 | 0.254  | 0.183  | 0.275  | 0.384  | 0.154  | 0.168  | 0.286  | 0.403  | 0.493  | 0.483  | 0.552  | 0.657  | 1  | 3  |
| 1409    | EPS  | TAU      | 3.781 | 1.698  | 1.520  | 1.576  | 1.384  | 0.467  | 0.484  | 0.754  | 0.994  | 1.210  | 1.329  | 1.461  | 1.647  | 2  | 2  |
| 1411    | THE  | 1 TAU    | 4.088 | 1.482  | 1.328  | 1.402  | 1.266  | 0.441  | 0.463  | 0.722  | 0.965  | 1.173  | 1.268  | 1.413  | 1.584  | 6  | 4  |
| 1412    | THE  | 2 TAU    | 3.474 | 0.307  | 0.244  | 0.198  | 0.205  | 0.052  | 0.094  | 0.179  | 0.229  | 0.271  | 0.269  | 0.317  | 0.350  | 7  | 3  |
| 1427    |      | A7 V     | 4.840 | 0.275  | 0.216  | 0.218  | 0.193  | 0.069  | 0.109  | 0.146  | 0.191  | 0.244  | 0.244  | 0.284  | 0.276  | 2  | 2  |
| 1437    | 45   | ERI      | 5.224 | 2.649  | 2.328  | 2.359  | 1.896  | 0.605  | 0.626  | 0.986  | 1.312  | 1.583  | 1.743  | 1.963  | 2.202  | 2  | 2  |
| 1444    | RHO  | TAU      | 4.765 | 0.265  | 0.200  | 0.230  | 0.271  | 0.096  | 0.113  | 0.190  | 0.253  | 0.312  | 0.333  | 0.347  | 0.404  | 2  | 2  |
| 1453    | UPS  | 1 ERI    | 4.755 | 1.506  | 1.286  | 1.451  | 1.260  | 0.444  | 0.490  | 0.774  |        |        |        |        |        | 1  | 0  |
| 1454    | 58   | PER      | 4.525 | 1.777  | 1.627  | 1.648  | 1.557  | 0.637  | 0.593  | 0.947  | 1.252  | 1.527  | 1.676  | 1.916  | 2.138  | 2  | 3  |
| 1457    | ALF  | TAU      | 1.333 | 3.376  | 2.905  | 2.926  | 2.287  | 0.640  |        |        |        |        |        |        |        |    |    |



H. L. JOHNSON AND R. I. MITCHELL

311

TABLE 7 (CONTINUED)

| B.S.    | NAME      | SP.         | TYPE | 52    | 33-52  | 35-52  | 37-52  | 40-52  | 45-52  | 52-58  | 52-63  | 52-72  | 52-80  | 52-86  | 52-99  | 52-110 | ND | NR |
|---------|-----------|-------------|------|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|----|----|
| 1568 D  | 7 CAM     | A1 V        |      | 4.498 | 0.039  | 0.030  | -0.080 | -0.028 | 0.020  | 0.001  | 0.015  | 0.012  | 0.023  | 0.024  | 0.034  | 0.045  | 2  | 2  |
| 1570    | PI 1 ORI  | A0 V        |      | 4.695 | 0.118  | 0.108  | 0.147  | 0.115  | 0.037  | 0.018  | 0.040  | 0.070  | 0.088  | 0.101  | 0.120  | 0.157  | 2  | 2  |
| 1577    | 107 AUR   | K3 II       |      | 3.097 | 3.146  | 2.782  | 2.793  | 2.248  | 0.688  | 0.730  | 1.137  | 1.516  | 1.842  | 1.994  | 2.287  | 2.528  | 2  | 2  |
| 1580    | DHI 2 ORI | K2 III      |      | 4.405 | 2.101  | 1.835  | 1.924  | 1.599  | 0.529  | 0.559  | 0.889  | 1.201  | 1.457  | 1.582  | 1.787  | 2.008  | 2  | 2  |
| 1592 D  | 41 AUR    | A0 V        |      | 4.957 | -0.034 | -0.027 | 0.058  | 0.039  | 0.013  | 0.018  | 0.022  | 0.056  | 0.061  | 0.028  | 0.079  | 0.115  | 2  | 2  |
| 1601    | PI 6 ORI  | K2 II       |      | 4.821 | 2.779  | 2.498  | 2.473  | 2.018  | 0.658  | 0.664  | 1.038  | 1.362  | 1.657  | 1.810  | 2.048  | 2.301  | 2  | 2  |
| 1603    | BET CAM   | G0 IB       |      | 4.248 | 1.417  | 1.144  | 1.128  | 1.144  | 0.468  | 0.417  | 0.683  | 0.925  | 1.106  | 1.175  | 1.318  | 1.466  | 2  | 3  |
| 1605 V  | EPS AUR   | F0 IAP      |      | 3.137 | 1.174  | 0.870  | 0.351  | 0.524  | 0.330  | 0.293  | 0.495  | 0.668  | 0.817  | 1.014  | 1.118  | 1.215  | 7  | 2  |
| 1611    | 64 ERI    | F0 IV       |      | 4.856 | 0.465  | 0.371  | 0.250  | 0.298  | 0.136  | 0.147  | 0.240  | 0.370  | 0.433  | 0.467  | 0.476  | 0.532  | 2  | 2  |
| 1612 V  | ZET AUR   | K5 II+B     |      | 4.133 | 1.104  | 1.087  | 1.278  | 1.408  | 0.590  | 0.713  | 1.133  | 1.617  | 1.967  | 2.106  | 2.383  | 2.646  | 3  | 2  |
| 1617    | PSI ERI   | B2 V        |      | 4.794 | -1.218 | -1.114 | -0.729 | -0.235 | -0.047 | -0.063 | -0.107 | -0.126 | -0.188 | -0.256 | -0.382 | -0.531 | 2  | 2  |
| 1621    |           | B9          |      | 4.897 | -0.256 | -0.232 | -0.172 | -0.069 | -0.002 | -0.008 | -0.024 | -0.028 | -0.021 | -0.051 | -0.071 | -0.114 | 2  | 2  |
| 1637    | 9 AUR     | F0 V        |      | 5.047 | 0.173  | 0.116  | 0.227  | 0.372  | 0.173  | 0.162  | 0.292  | 0.392  | 0.474  | 0.507  | 0.545  | 0.629  | 2  | 2  |
| 1638    | 11 ORI    | B9P         |      | 4.677 | -0.178 | -0.195 | -0.262 | -0.102 | -0.041 | 0.039  | 0.024  | 0.032  | 0.024  | 0.017  | 0.017  | 0.065  | 2  | 2  |
| 1641    | ETA AUR   | B3 V        |      | 3.148 | -1.141 | -1.036 | -0.686 | -0.244 | -0.068 | -0.041 | -0.093 | -0.135 | -0.167 | -0.221 | -0.322 | -0.344 | 2  | 2  |
| 1652    | GAM CAE   | GK3         | X    | 4.886 | 2.073  | 1.768  | 2.022  | 1.541  | 0.518  | 0.645  | 0.986  | 1.213  | 1.484  | 1.614  | 1.822  | 2.086  | 1  | 2  |
| 1654    | EPS LEP   | K5 III      | X    | 3.603 | 3.076  | 2.644  | 2.775  | 2.095  | 0.601  | 0.757  | 1.167  | 1.507  | 1.814  | 1.974  | 2.259  | 2.533  | 2  | 2  |
| 1657    | 66 ERI    | B9          |      | 5.096 | -0.346 | -0.314 | -0.207 | -0.098 | -0.034 | 0.004  | -0.017 | -0.005 | -0.037 | -0.074 | -0.096 | -0.104 | 2  | 1  |
| 1666    | BET ERI   | A3 III      |      | 2.841 | 0.288  | 0.210  | 0.188  | 0.162  | 0.068  | 0.052  | 0.122  |        |        |        |        |        | 2  | 0  |
| 1676    | 15 ORI    | F2 IV       |      | 4.886 | 0.477  | 0.385  | 0.308  | 0.349  | 0.152  | 0.200  | 0.289  | 0.430  | 0.521  | 0.545  | 0.596  | 0.702  | 2  | 2  |
| 1679    | LAM ERI   | B2 IV       |      | 4.242 | -1.444 | -1.337 | -0.897 | -0.261 | -0.055 | -0.053 | -0.083 | -0.149 | -0.208 | -0.254 | -0.384 | -0.379 | 2  | 2  |
| 1689    | MU AUR    | AM          |      | 4.876 | 0.212  | 0.182  | 0.227  | 0.247  | 0.093  | 0.097  | 0.159  | 0.233  | 0.270  | 0.285  | 0.306  | 0.387  | 2  | 2  |
| 1696    | 107 LEP   | B8 V        |      | 4.422 | -0.693 | -0.641 | -0.419 | -0.130 | -0.027 | -0.034 | -0.055 | -0.033 | -0.055 | -0.086 | -0.156 | -0.180 | 2  | 2  |
| 1698 D  | RHD ORI   | K3 III      |      | 4.741 | 2.135  | 1.937  | 1.979  | 1.669  | 0.518  | 0.564  | 0.875  | 1.176  | 1.439  | 1.559  | 1.753  | 1.962  | 2  | 2  |
| 1702    | MU LEP    | B9 IIIP     |      | 3.267 | -0.657 | -0.609 | -0.449 | -0.165 | -0.039 | -0.035 | -0.048 | -0.077 | -0.059 | -0.097 | -0.170 | -0.170 | 2  | 2  |
| 1705 D  | KAP LEP   | B8 V        |      | 4.345 | -0.595 | -0.536 | -0.449 | -0.147 | -0.021 | -0.032 | -0.035 | -0.058 | -0.074 | -0.073 | -0.143 | -0.173 | 2  | 2  |
| 1708    | ALF AUR   | G8 III+P    |      | 0.243 | 1.041  | 0.882  | 0.955  | 1.005  | 0.380  | 0.391  | 0.627  | 0.859  | 1.036  | 1.080  | 1.232  | 1.420  | 2  | 2  |
| 1713    | BET ORI   | B8 IA       |      | 0.172 | -0.945 | -0.903 | -0.691 | -0.110 | 0.046  | 0.021  | 0.047  | 0.080  | 0.073  | 0.100  | 0.004  | 0.000  | 4  | 2  |
| 1729    | LAM AUR   | G0 V        |      | 4.860 | 0.477  | 0.306  | 0.570  | 0.729  | 0.291  | 0.323  | 0.523  | 0.728  | 0.871  | 0.907  | 0.985  | 1.117  | 3  | 2  |
| 1735    | TAU ORI   | B5 III      |      | 3.570 | -0.793 | -0.715 | -0.532 | -0.172 | -0.043 | -0.047 | -0.059 | -0.080 | -0.095 | -0.123 | -0.187 | -0.160 | 2  | 2  |
| 1756    | LAM LEP   | B0.5 IV     |      | 4.248 | -1.667 | -1.550 | -1.015 | -0.331 | -0.071 | -0.098 | -0.153 | -0.230 | -0.296 | -0.366 | -0.529 | -0.537 | 2  | 3  |
| 1765    | 22 ORI    | B2 IV       |      | 4.687 | -1.289 | -1.181 | -0.785 | -0.230 | -0.042 | -0.079 | -0.116 | -0.186 | -0.194 | -0.251 | -0.354 | -0.399 | 2  | 1  |
| 1770 D  | 23 ORI    | B1 V        |      | 4.972 | -1.397 | -1.295 | -0.827 | -0.231 | -0.036 | -0.046 | -0.072 | -0.145 | -0.166 | -0.191 | -0.307 | -0.348 | 3  | 2  |
| 1781    |           | B5 V        |      | 5.655 | -1.467 | -1.350 | -0.869 | -0.274 | -0.068 | -0.087 | -0.131 | -0.153 | -0.234 | -0.255 | -0.446 | -0.466 | 2  | 2  |
| 1784    | 29 ORI    | G8 III      |      | 4.355 | 1.411  | 1.209  | 1.330  | 1.229  | 0.449  | 0.447  | 0.724  | 0.955  | 1.209  | 1.312  | 1.458  | 1.632  | 2  | 2  |
| 1788 DV | ETA ORI   | B0.5 V      |      | 3.324 | -1.510 | -1.406 | -0.933 | -0.274 | -0.048 | -0.044 | -0.071 | -0.108 | -0.142 | -0.183 | -0.328 | -0.376 | 3  | 2  |
| 1789    | 25 ORI    | B1 VIPE     |      | 4.934 | -1.478 | -1.361 | -0.915 | -0.293 | -0.063 | -0.062 | -0.110 | -0.156 | -0.179 | -0.240 | -0.389 | -0.418 | 2  | 1  |
| 1790    | GAM ORI   | B2 III      |      | 1.591 | -1.437 | -1.334 | -0.920 | -0.307 | -0.078 | -0.090 | -0.137 | -0.206 | -0.266 | -0.315 | -0.455 | -0.465 | 2  | 2  |
| 1791    | BET TAU   | B7 III      |      | 1.651 | -0.802 | -0.746 | -0.559 | -0.178 | -0.041 | -0.047 | -0.050 | -0.114 | -0.124 | -0.152 | -0.216 | -0.221 | 2  | 2  |
| 1810    | 114 TAU   | B3 V        |      | 4.839 | -1.269 | -1.178 | -0.755 | -0.223 | -0.026 | -0.064 | -0.099 | -0.143 | -0.164 | -0.207 | -0.303 | -0.360 | 2  | 3  |
| 1811 D  | PSI ORI   | B2 IV       |      | 4.543 | -1.520 | -1.388 | -0.908 | -0.282 | -0.063 | -0.077 | -0.119 | -0.191 | -0.243 | -0.295 | -0.442 | -0.506 | 2  | 2  |
| 1829    | BET LEP   | G5 III      |      | 3.003 | 1.110  | 0.853  | 0.982  | 1.000  | 0.393  | 0.373  | 0.623  | 0.834  | 1.023  | 1.104  | 1.228  | 1.433  | 8  | 4  |
| 1839 D  | 32 ORI    | B5 IV       |      | 4.189 | -0.976 | -0.884 | -0.567 | -0.191 | -0.057 | -0.047 | -0.077 | -0.133 | -0.172 | -0.205 | -0.274 | -0.268 | 2  | 2  |
| 1843    | CHI AUR   | B5 IAB      |      | 4.789 | -0.480 | -0.485 | -0.260 | 0.281  | 0.238  | 0.121  | 0.262  | 0.394  | 0.516  | 0.578  | 0.648  | 0.698  | 2  | 2  |
| 1845 V  | 119 TAU   | M2 IB       |      | 4.889 | 4.492  | 3.888  | 3.600  | 2.944  | 1.114  | 0.936  | 1.606  | 2.424  | 3.030  | 3.325  | 3.814  | 4.180  | 1  | 1  |
| 1852 V  | DEL ORI   | D9.5 II     |      | 2.181 | -1.674 | -1.557 | -1.014 | -0.299 | -0.058 | -0.094 | -0.125 | -0.206 | -0.256 | -0.311 | -0.480 | -0.471 | 2  | 2  |
| 1855    | UPS ORI   | B0 V        |      | 4.571 | -1.727 | -1.588 | -1.046 | -0.341 | -0.076 | -0.090 | -0.152 | -0.228 | -0.300 | -0.361 | -0.546 | -0.568 | 87 | 28 |
| 1861    |           | B1 V        |      | 5.300 | -1.493 | -1.383 | -0.894 | -0.276 | -0.061 | -0.074 | -0.078 | -0.081 | -0.260 | -0.260 | -0.358 | -0.358 | 2  | 2  |
| 1862    | EPS COL   | GK1         | X    | 4.143 | 2.128  | 1.740  | 1.921  | 1.519  | 0.543  | 0.547  | 0.835  | 1.065  | 1.318  | 1.432  | 1.618  | 1.850  | 1  | 2  |
| 1865    | ALF LEP   | F0 IB       |      | 2.646 | 0.875  | 0.687  | 0.151  | 0.207  | 0.097  | 0.139  | 0.237  | 0.365  | 0.367  | 0.459  | 0.496  | 0.576  | 2  | 2  |
| 1868 V  | VV ORI    | B1 V        |      | 5.327 | -1.452 | -1.347 | -0.861 | -0.263 | -0.066 | -0.060 | -0.064 | -0.108 | -0.130 | -0.225 | -0.381 | -0.382 | 2  | 2  |
| 1876    | PHI 1 ORI | B0 IV       |      | 4.380 | -1.503 | -1.385 | -0.862 | -0.221 | -0.013 | -0.037 | -0.060 | -0.116 | -0.173 | -0.304 | -0.339 | 2      | 2  |    |
| 1879/80 | LAM ORI   | B0          |      | 3.381 | -1.611 | -1.503 | -0.972 | -0.283 | -0.055 | -0.028 | -0.043 | -0.085 | -0.119 | -0.172 | -0.305 | -0.294 | 2  | 2  |
| 1887    |           | B0 V        |      | 4.719 | -1.658 | -1.544 | -1.013 | -0.332 | -0.074 | -0.095 | -0.166 | -0.200 | -0.259 | -0.318 | -0.483 | -0.527 | 2  | 2  |
| 1892 D  | 42 ORI    | B2 III      |      | 4.556 | -1.512 | -1.397 | -0.890 | -0.270 | -0.054 | -0.066 | -0.097 | -0.151 | -0.198 | -0.248 | -0.368 | -0.358 | 2  | 2  |
| 1893-6  | THE 1 ORI | B0.5 VITRAP |      | 4.627 | -1.278 | -1.158 | -0.708 | -0.047 | 0.096  | 0.054  | 0.246  | 0.269  | 0.337  | 0.356  | 0.593  | 0.741  | 14 | 3  |
| 1897    | THE 2 ORI | B0.5 VP     |      | 5.076 | -1.455 | -1.335 | -0.828 | -0.178 | -0.002 | 0.037  | 0.085  | 0.083  | 0.098  | 0.085  | 0.022  | -0.080 | 2  | 2  |
| 1899 D  | 107 ORI   | B0 III      |      | 2.758 | -1.716 | -1.584 | -1.039 | -0.334 | -0.077 | -0.080 | -0.103 | -0.207 | -0.262 | -0.324 | -0.503 | -0.477 | 2  | 2  |
| 1901    | 45 ORI    | GFO         |      | 5.334 | 0.423  | 0.337  | 0.242  | 0.293  | 0.130  | 0.147  | 0.252  | 0.333  | 0.406  | 0.429  | 0.460  | 0.592  | 2  | 1  |
| 1903 V  | EPS ORI   | B0 IA       |      | 1.694 | -1.594 | -1.485 | -0.972 | -0.257 | -0.028 | -0.046 | -0.069 | -0.113 | -0.155 | -0.214 | -0.342 | -0.343 | 2  | 2  |
| 1907    | PHI 2 ORI | G8 IIIP     |      | 4.329 | 1.351  | 1.114  | 1.276  | 1.196  | 0.451  | 0.470  | 0.770  | 1.018  | 1.254  | 1.351  | 1.488  | 1.726  | 2  | 2  |
| 1908    |           | K5 III      |      | 6.349 | 3.506  | 2.894  | 2.921  | 2.299  | 0.703  | 0.792  | 1.262  | 1.802  | 2.241  | 2.418  | 2.706  | 2.961  | 1  | 1  |
| 1910    | ZET TAU   | B2 IVP      |      | 2.955 | -1.214 | -1.131 | -0.849 | -0.267 | -0.039 | -0.058 | -0.006 | -0.169 | -0.203 | -0.149 | -0.252 | -0.168 | 2  | 2  |
| 1922    | BET DOR   | F8 IA CEP.  |      | 3.940 | 1.380  | 1.140  | 1.090  | 1.140  | 0.420  | 0.410  | 0.640  |        |        |        |        |        | 1  | 0  |
| 1931 D  | SIG ORI   | D9.5 V      |      | 3.722 | -1.628 | -1.497 | -0.973 | -0.293 | -0.055 | -0.069 | -0.113 | -0.128 | -0.196 | -0.239 | -0.399 | -0.418 | 2  | 2  |
| 1934    | DMG ORI   | B3 IIIE     |      | 4.568 | -1.189 | -1.101 | -0.737 | -0.171 | 0.007  | -0.019 | 0.004  | -0.011 | 0.024  | -0.046 | -0.116 | -0.085 | 2  | 2  |
| 1937    | 49 ORI    | A4 IV       |      | 4.819 | 0.226  | 0.184  | 0.185  | 0.169  | 0.070  | 0.071  | 0.111  | 0.136  | 0.198  | 0.174  | 0.238  | 0.309  | 2  | 1  |
| 1946 D  | 126 TAU   | B3 IV       |      | 4.839 | -1.061 | -0.984 | -0.647 | -0.191 | -0.027 | -0.029 | -0.051 | -0.083 | -0.103 | -0.141 | -0.218 | -0.259 | 2  | 2  |
| 1948/9  | ZET ORI   | D9.5 IB     |      | 1.744 | -1.662 | -1.548 | -1.011 | -0.294 | -0.050 | -0.051 | -0.080 | -0.127 | -0.169 | -0.263 | -0.366 | -0.401 | 2  | 2  |
| 1956    | ALF COL   | B8 VE       | X    | 2.63  |        |        |        |        |        |        |        |        |        |        |        |        |    |    |



## THIRTEEN-COLOR PHOTOMETRY OF 1380 BRIGHT STARS

TABLE 7 (CONTINUED)

| B.S.    | NAME      | SP. TYPE    | 52     | 33-52  | 35-52  | 37-52  | 40-52  | 45-52  | 52-58  | 52-63  | 52-72  | 52-80  | 52-86  | 52-99  | 52-110 | NB | NR |
|---------|-----------|-------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|----|----|
| 2091 V  | PI AUR    | M3.5 II     | 4.739  | 3.782  | 3.167  | 2.991  | 2.403  | 0.929  | 0.684  | 1.332  | 2.311  | 2.966  | 3.225  | 3.692  | 4.037  | 2  | 2  |
| 2095 D  | THE AUR   | B9.5P V     | 2.592  | -0.290 | -0.270 | -0.310 | -0.126 | -0.050 | 0.019  | -0.012 |        |        |        |        |        | 2  | 0  |
| 2113    | K2 III    |             | 4.854  | 2.327  | 1.935  | 2.019  | 1.651  | 0.543  | 0.614  | 0.968  | 1.272  | 1.580  | 1.708  | 1.920  | 2.164  | 2  | 2  |
| 2120    | ETA COL   | K0 III      | 4.247  | 2.015  | 1.723  | 1.869  | 1.538  | 0.574  | 0.568  | 0.858  | 1.096  | 1.340  | 1.424  | 1.621  | 1.895  | 1  | 2  |
| 2124 D  | NU DRI    | AM          | 4.159  | 0.265  | 0.225  | 0.206  | 0.209  | 0.082  | 0.086  | 0.146  | 0.211  | 0.288  | 0.296  | 0.347  | 0.422  | 3  | 1  |
| 2128    | 3 MON     | B5 IV       | 4.954  | -1.003 | -0.906 | -0.603 | -0.187 | -0.037 | -0.033 | -0.042 | -0.146 | -0.122 | -0.135 | -0.186 | -0.133 | 2  | 2  |
| 2135    | CHI 2 ORI | B2 IA       | 4.680  | -0.778 | -0.773 | -0.386 | 0.232  | 0.239  | 0.138  | 0.263  | 0.351  | 0.466  | 0.520  | 0.518  | 0.645  | 2  | 2  |
| 2148    | 17 LEP    | A0          | 5.004  | 0.668  | 0.437  | 0.144  | 0.168  | 0.151  | 0.136  | 0.325  | 0.683  | 1.064  | 1.255  | 1.560  | 1.833  | 2  | 2  |
| 2155    | THE LEP   | A1 V        | 4.682  | 0.088  | 0.085  | 0.076  | 0.058  | 0.039  | 0.005  | 0.019  | 0.009  | 0.029  | 0.040  | 0.056  | 0.092  | 2  | 2  |
| 2159    | NU DRI    | B3 V        | 4.399  | -1.095 | -0.996 | -0.648 | -0.225 | -0.058 | -0.045 | -0.073 | -0.194 | -0.214 | -0.252 | -0.351 | -0.372 | 2  | 3  |
| 2198    | 69 ORI    | B5 V        | 4.954  | -0.977 | -0.907 | -0.606 | -0.204 | -0.046 | -0.041 | -0.055 | -0.105 | -0.112 | -0.156 | -0.236 | -0.249 | 2  | 2  |
| 2199    | XI ORI    | B3 V        | 4.455  | -1.115 | -1.019 | -0.689 | -0.235 | -0.056 | -0.057 | -0.060 | -0.133 | -0.174 | -0.203 | -0.296 | -0.276 | 2  | 2  |
| 2209    | 22 CAM    | A0 V        | 4.758  | 0.004  | -0.005 | 0.002  | 0.009  | -0.003 | 0.004  | 0.006  | 0.038  | 0.057  | 0.041  | 0.069  | 0.108  | 2  | 2  |
| 2216 V  | ETA GEM   | M3 III      | 3.603  | 3.190  | 2.757  | 2.714  | 2.252  | 0.789  | 0.688  | 1.259  | 2.084  | 2.713  | 2.947  | 3.354  | 3.662  | 3  | 1  |
| 2219    | KAP GEM   | G0 III      | 4.563  | 1.629  | 1.399  | 1.509  | 1.825  | 0.474  | 0.486  | 0.795  | 1.050  | 1.295  | 1.404  | 1.565  | 1.769  | 2  | 2  |
| 2227    | GAM MON   | K3 III      | 4.295  | 2.615  | 2.277  | 2.327  | 1.885  | 0.602  | 0.624  | 0.991  | 1.311  | 1.585  | 1.738  | 1.957  | 2.212  | 2  | 2  |
| 2238    | 2 LYN     | A2 V        | 4.517  | 0.038  | 0.025  | 0.049  | 0.031  | 0.011  | 0.020  | 0.038  | 0.006  | 0.030  | 0.013  | 0.037  | 0.023  | 2  | 3  |
| 2240    | 9 GEM     | B3 IA       | 6.379  | -0.204 | -0.255 | -0.068 | 0.421  | 0.306  | 0.260  | 0.436  | 0.657  | 0.841  | 0.921  | 1.018  | 1.094  | 2  | 2  |
| 2244    |           | B8 V        | 5.002  | -0.375 | -0.348 | -0.340 | -0.124 | -0.029 | -0.008 | -0.015 | -0.022 | -0.039 | -0.042 | -0.059 | -0.043 | 2  | 2  |
| 2282    | ZET CMA   | B2.5IV      | 2.996  | -1.181 | -1.135 | -0.711 | -0.293 | -0.042 | -0.061 | -0.131 | -0.186 | -0.244 | -0.279 | -0.351 | -0.341 | 2  | 2  |
| 2286    | MU GEM    | M3 IIIA     | 3.321  | 3.747  | 3.123  | 3.000  | 2.388  | 0.842  | 0.673  | 1.268  | 2.161  | 2.767  | 3.010  | 3.405  | 3.732  | 2  | 2  |
| 2294    | BET CMA   | B1 II-III   | 1.957  | -1.575 | -1.449 | -0.967 | -0.315 | -0.071 | -0.077 | -0.129 | -0.196 | -0.247 | -0.312 | -0.478 | -0.493 | 2  | 2  |
| 2296    | DEL COL   | G64         | 3.993  | 1.196  | 0.967  | 1.092  | 1.080  | 0.403  | 0.396  | 0.647  | 0.838  | 1.090  | 1.179  | 1.292  | 1.419  | 1  | 1  |
| 2298/9  | EPS MON   | A5 IV /DF4  | 4.340  | 0.290  | 0.206  | 0.219  | 0.263  | 0.117  | 0.123  | 0.179  | 0.249  | 0.320  | 0.335  | 0.354  | 0.411  | 2  | 3  |
| 2308 V. | BL ORI    |             | 7.055  | 6.274  | 5.533  | 5.505  | 4.185  | 1.275  | 1.260  | 1.936  | 2.468  | 2.967  | 3.480  | 3.885  | 4.318  | 1  | 1  |
| 2326    | ALF CAR   | F0 IB-II    | -0.696 | 0.778  | 0.610  | 0.117  | 0.149  | 0.090  | 0.139  | 0.190  | 0.218  | 0.274  | 0.350  | 0.398  | 0.475  | 10 | 5  |
| 2343    | NU GEM    | B7 IV       | 4.166  | -0.795 | -0.723 | -0.548 | -0.175 | -0.045 | -0.017 | -0.029 | -0.075 | -0.086 | -0.105 | -0.178 | -0.174 | 1  | 2  |
| 2344    | 10 MON    | B2 V        | 5.032  | -1.257 | -1.151 | -0.751 | -0.244 | -0.044 | -0.062 | -0.097 | -0.183 | -0.205 | -0.241 | -0.370 | -0.296 | 2  | 2  |
| 2356-8  | BET MON   | B3 VPE      | 3.720  | -1.224 | -1.142 | -0.759 | -0.222 | -0.056 | -0.056 | -0.003 | -0.121 | -0.113 | -0.168 | -0.279 | -0.279 | 2  | 2  |
| 2385    | 13 MON    | A0 IB       | 4.534  | -0.082 | -0.127 | -0.366 | -0.023 | 0.053  | 0.034  | 0.087  | 0.088  | 0.114  | 0.158  | 0.147  | 0.231  | 2  | 2  |
| 2392    |           | BA II (KOP) | 6.496  | 1.550  | 1.446  | 1.595  | 1.508  | 0.532  | 0.479  | 0.769  | 1.007  | 1.211  | 1.310  | 1.446  | 1.679  | 2  | 2  |
| 2421    | GAM GEM   | A0 IV       | 1.957  | 0.129  | 0.121  | 0.014  | 0.008  | 0.006  | 0.013  | 0.020  | 0.036  | 0.039  | 0.044  | 0.066  | 0.101  | 2  | 2  |
| 2427    | PSI 2 AUR | K3 II-III   | 5.117  | 2.356  | 2.093  | 2.159  | 1.749  | 0.555  | 0.595  | 0.924  | 1.221  | 1.487  | 1.610  | 1.822  | 2.045  | 2  | 3  |
| 2429    | NU 2 CMA  | K1 IV       | 4.236  | 1.792  | 1.655  | 1.752  | 1.432  | 0.456  | 0.525  | 0.820  | 1.053  | 1.283  | 1.382  | 1.535  | 1.729  | 2  | 2  |
| 2443    | NU 3 CMA  | K1 II-III   | 4.719  | 2.019  | 1.794  | 1.862  | 1.579  | 0.531  | 0.533  | 0.855  | 1.124  | 1.370  | 1.487  | 1.664  | 1.914  | 2  | 2  |
| 2450    |           | K3 III      | 5.217  | 3.123  | 2.743  | 2.737  | 2.183  | 0.702  | 0.724  | 1.136  | 1.491  | 1.805  | 1.967  | 2.236  | 2.522  | 2  | 3  |
| 2451    | UPS PUP   | B8 III      | 3.168  | -0.535 | -0.570 | -0.527 | -0.189 | 0.007  | 0.000  | -0.021 | -0.064 | -0.057 | -0.054 | -0.130 | -0.071 | 2  | 2  |
| 2456 D  | 15 MON    | O7          | 4.641  | -1.700 | -1.566 | -1.016 | -0.319 | -0.059 | -0.076 | -0.116 | -0.193 | -0.241 | -0.310 | -0.455 | -0.560 | 2  | 2  |
| 2467    |           | O6          | 6.396  | -1.416 | -1.316 | -0.798 | -0.133 | 0.023  | 0.030  | 0.042  | 0.091  | 0.076  | 0.060  | -0.052 | -0.038 | 1  | 3  |
| 2470 D  | 12 LYN    | AGN         | 4.896  | 0.093  | 0.083  | 0.122  | 0.102  | 0.046  | 0.033  | 0.058  | 0.088  | 0.106  | 0.112  | 0.132  | 0.198  | 1  | 2  |
| 2473    | EPS GEM   | G8 IB       | 3.357  | 2.689  | 2.397  | 2.363  | 2.016  | 0.689  | 0.629  | 0.960  | 1.281  | 1.544  | 1.675  | 1.887  | 2.092  | 1  | 2  |
| 2478    | 30 GEM    | K1 III      | 4.813  | 2.156  | 1.890  | 1.960  | 1.614  | 0.531  | 0.568  | 0.878  | 1.202  | 1.449  | 1.589  | 1.774  | 2.010  | 1  | 2  |
| 2484    | XI GEM    | F5 IV       | 3.542  | 0.305  | 0.224  | 0.328  | 0.496  | 0.223  | 0.212  | 0.395  | 0.522  | 0.638  | 0.673  | 0.711  | 0.807  | 1  | 2  |
| 2491    | ALF CMA   | A1 V        | -1.424 | -0.097 | -0.090 | -0.021 | -0.022 | -0.021 | -0.006 | -0.021 | -0.010 | -0.015 | -0.030 | -0.046 | -0.036 | 11 | 9  |
| 2506    | 18 MON    | K0 III      | 4.746  | 1.975  | 1.761  | 1.807  | 1.537  | 0.519  | 0.516  | 0.819  | 1.083  | 1.322  | 1.425  | 1.604  | 1.824  | 2  | 2  |
| 2527    |           | K4 III      | 4.958  | 2.839  | 2.494  | 2.567  | 1.988  | 0.552  | 0.729  | 1.111  | 1.464  | 1.779  | 1.918  | 2.153  | 2.394  | 2  | 4  |
| 2538    | KAP CMA   | B1.5 IVNE   | 4.228  | -2.093 | -2.027 | -1.359 | -0.710 | -0.498 | 0.463  | 0.516  | 0.526  | 0.563  | 0.452  | 0.247  | 0.336  | 1  | 1  |
| 2540    | THE GEM   | A3 III      | 3.676  | 0.318  | 0.265  | 0.134  | 0.115  | 0.049  | 0.073  | 0.122  | 0.154  | 0.206  | 0.203  | 0.257  | 0.303  | 2  | 2  |
| 2550    | ALF PIC   | A5 V        | 3.341  | 0.387  | 0.280  | 0.233  | 0.238  | 0.117  | 0.142  | 0.200  | 0.302  | 0.353  | 0.375  | 0.413  | 0.464  | 6  | 2  |
| 2553    | TAU PUP   | K0 III      | 3.227  | 2.248  | 2.018  | 2.036  | 1.691  | 0.539  | 0.591  | 0.902  | 1.151  | 1.422  | 1.547  | 1.733  | 1.916  | 4  | 1  |
| 2560 D  | 15 LYN    | G5 III-IV   | 4.584  | 1.138  | 1.011  | 1.100  | 1.076  | 0.398  | 0.436  | 0.683  | 0.905  | 1.115  | 1.187  | 1.368  | 1.556  | 2  | 1  |
| 2564 D  | 38 GEM    | F0 VP       | 4.750  | 0.230  | 0.177  | 0.258  | 0.351  | 0.171  | 0.187  | 0.301  | 0.470  | 0.552  | 0.532  | 0.594  | 0.693  | 2  | 2  |
| 2571    | 15 CMA    | B1 IV       | 4.780  | -1.548 | -1.412 | -0.934 | -0.306 | -0.051 | -0.079 | -0.126 | -0.158 | -0.206 | -0.302 | -0.470 | -0.517 | 2  | 4  |
| 2574    | THE CMA   | K3+ III     | 4.475  | 3.027  | 2.579  | 2.663  | 2.065  | 0.608  | 0.741  | 1.167  | 1.546  | 1.847  | 2.036  | 2.278  | 2.545  | 2  | 2  |
| 2585    | 16 LYN    | A2 V        | 4.942  | 0.085  | 0.079  | 0.039  | 0.007  | 0.051  | 0.029  | 0.029  | 0.052  | 0.069  | 0.063  | 0.093  | 0.066  | 2  | 2  |
| 2590 D. | PI CMA    | Gf2         | 4.744  | 0.250  | 0.183  | 0.266  | 0.405  | 0.195  | 0.202  | 0.336  | 0.462  | 0.567  | 0.576  | 0.622  | 0.710  | 2  | 1  |
| 2596    | LOT CMA   | B3 II       | 4.380  | -1.055 | -0.969 | -0.688 | -0.127 | 0.024  | -0.005 | 0.019  | 0.046  | 0.036  | 0.027  | -0.039 | -0.030 | 2  | 2  |
| 2618    | EPS CMA   | B2 II       | 1.471  | -1.559 | -1.476 | -0.940 | -0.376 | -0.075 | -0.072 | -0.111 | -0.182 | -0.210 | -0.282 | -0.423 | -0.377 | 2  | 2  |
| 2646    | SIG CMA   | M0 IAB      | 3.935  | 3.545  | 3.148  | 3.042  | 2.521  | 0.814  | 0.853  | 1.292  | 1.864  | 2.303  | 2.496  | 2.832  | 3.122  | 1  | 1  |
| 2648    | 19 MON    | B1 V        | 4.970  | -1.487 | -1.368 | -0.917 | -0.277 | -0.050 | -0.060 | -0.079 | -0.096 | -0.140 | -0.221 | -0.360 | -0.361 | 2  | 3  |
| 2650 V. | ZET GEM   | F7-G3 IB    | 3.946  | 1.194  | 0.942  | 0.859  | 0.917  | 0.372  | 0.373  | 0.562  | 0.782  | 0.953  | 1.018  | 1.126  | 1.254  | 1  | 1  |
| 2653    | OMI 2 CMA | B3 IA       | 2.993  | -1.247 | -1.203 | -0.809 | -0.251 | -0.021 | -0.042 | -0.002 | -0.026 | -0.041 | -0.082 | -0.129 | -0.108 | 1  | 2  |
| 2657    | GAM CMA   | B8 II       | 4.107  | -0.780 | -0.726 | -0.542 | -0.167 | -0.030 | -0.021 | -0.039 | -0.057 | -0.079 | -0.106 | -0.164 | -0.207 | 2  | 2  |
| 2693    | DEL CMA   | F8 IA       | 1.998  | 1.305  | 0.970  | 0.779  | 0.728  | 0.296  | 0.348  | 0.505  | 0.662  | 0.816  | 0.887  | 0.988  | 1.135  | 2  | 2  |
| 2697    | TAU GEM   | K2 III      | 4.705  | 2.548  | 2.243  | 2.264  | 1.830  | 0.567  | 0.605  | 0.950  | 1.239  | 1.508  | 1.653  | 1.848  | 2.081  | 2  | 2  |
| 2701    | 20 MON    | K0 III      | 5.165  | 1.579  | 1.353  | 1.469  | 1.319  | 0.453  | 0.484  | 0.769  | 1.048  | 1.285  | 1.393  | 1.549  | 1.774  | 2  | 2  |
| 2714    | DEL MON   | A0 IV       | 4.182  | 0.133  | 0.099  | -0.091 | -0.043 | -0.020 | 0.046  | 0.061  | 0.052  | 0.074  | 0.102  | 0.112  | 0.120  | 2  | 2  |
| 2735/6  | GAM 2 VOL | G8 III+DF4  | 3.820  | 1.288  | 1.140  | 1.227  | 1.160  | 0.420  | 0.440  | 0.710  | 0.964  | 1.189  | 1.255  | 1.425  | 1.576  | 4  | 1  |
| 2748    | GMS E     |             | 5.438  | 3.351  | 2.550  | 2.163  | 1.865  | 1.061  | 0.697  | 1.606  | 2.786  | 3.692  | 4.152  | 7.528  | 7.828  | 1  | 1  |
| 2749    | ONE CMA   | B2 IV-VE    | 3.894  | -1.237 | -1.175 | -0.722 | -0.197 | -0.030 | -0.043 | 0.012  | 0.007  | 0.033  | -0.069 | -0.192 | -0.046 | 1  | 1  |
| 2751    |           | A3 III-IV   | 5.030  | 0.292  | 0.233  |        |        |        |        |        |        |        |        |        |        |    |    |

TABLE 7 (CONTINUED)

| B.S.   | NAME  | SP. | TYPE          | 52    | 33-52  | 35-52  | 37-52  | 40-52  | 45-52  | 52-58  | 52-63  | 52-72  | 52-80  | 52-86  | 52-99  | 52-110 | NB | NR |
|--------|-------|-----|---------------|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|----|----|
| 2946   | 24    | LYN | A3 III        | 5.006 | 0.248  | 0.184  | 0.083  | 0.074  | 0.043  | 0.046  | 0.077  | 0.121  | 0.167  | 0.161  | 0.196  | 0.317  | 3  | 2  |
| 2970   | ALF   | MON | K0 III        | 4.187 | 1.683  | 1.508  | 1.578  | 1.379  | 0.484  | 0.465  | 0.752  | 1.000  | 1.227  | 1.340  | 1.483  | 1.689  | 3  | 2  |
| 2985 D | KAP   | GEM | G8 III        | 3.812 | 1.414  | 1.235  | 1.324  | 1.216  | 0.438  | 0.423  | 0.709  | 0.920  | 1.140  | 1.223  | 1.350  | 1.526  | 2  | 2  |
| 2990   | BET   | GEM | K0 III        | 1.388 | 1.624  | 1.443  | 1.524  | 1.328  | 0.455  | 0.460  | 0.777  | 1.025  | 1.252  | 1.343  | 1.491  | 1.698  | 16 | 2  |
| 2993   | 1     | PUP | GK5           | 5.061 | 3.485  | 2.620  | 2.951  | 2.436  | 0.710  | 0.816  | 1.283  | 1.870  | 2.301  | 2.436  | 2.766  | 3.062  | 1  | 1  |
| 2996   | 3     | PUP | A3 II EP      | 4.048 | 0.400  | 0.272  | -0.154 | 0.149  | 0.144  | 0.118  | 0.211  | 0.314  | 0.357  | 0.531  | 0.541  | 0.627  | 1  | 1  |
| 3003   | 81    | GEM | K5 III        | 5.300 | 3.107  | 2.660  | 2.719  | 2.100  | 0.596  | 0.750  | 1.183  | 1.628  | 2.004  | 2.148  | 2.430  | 2.709  | 2  | 2  |
| 3017   |       |     | CK            | 4.064 | 3.134  | 2.872  | 2.757  | 2.389  | 0.825  | 0.842  | 1.348  | 1.890  | 2.304  | 2.480  | 2.827  | 3.102  | 1  | 1  |
| 3024   | ZET   | VOL | K0 III        | 4.235 | 1.631  | 1.446  | 1.536  | 1.349  | 0.463  | 0.409  | 0.785  | 1.083  | 1.327  | 1.410  | 1.599  | 1.803  | 4  | 1  |
| 3045   | XI    | PUP | G3 IB         | 3.633 | 2.290  | 1.920  | 1.920  | 1.734  | 0.584  | 0.575  | 0.875  | 1.157  | 1.400  | 1.477  | 1.682  | 1.857  | 1  | 2  |
| 3064   | 9     | PUP | G1 V          | 5.321 | 0.379  | 0.279  | 0.512  | 0.675  | 0.275  | 0.309  | 0.509  | 0.715  | 0.883  | 0.919  | 1.014  | 1.149  | 1  | 2  |
| 3067   | PHI   | GEM | A4 V          | 5.003 | 0.224  | 0.204  | 0.160  | 0.121  | 0.053  | 0.055  | 0.088  | 0.129  | 0.163  | 0.167  | 0.201  | 0.166  | 2  | 3  |
| 3080   |       |     | G5 III        | 3.954 | 1.687  | 1.475  | 1.566  | 1.352  | 0.466  | 0.475  | 0.773  | 1.075  | 1.311  | 1.405  | 1.587  | 1.792  | 1  | 1  |
| 3117   | CHI   | CAR | B1 VP P       | 3.458 | -1.115 | -1.021 | -0.698 | -0.230 | -0.052 | -0.056 | -0.099 | -0.129 | -0.168 | -0.206 | -0.312 | -0.310 | 56 | 1  |
| 3129 V | V     | PUP | B1 VP+82      | 4.339 | -1.559 | -1.429 | -0.914 | -0.267 | -0.046 | -0.051 | -0.079 | -0.093 | -0.148 | -0.186 | -0.317 | -0.323 | 3  | 1  |
| 3131   |       |     | A3 V          | 4.653 | 0.218  | 0.203  | 0.115  | 0.089  | 0.039  | 0.039  | 0.067  | 0.097  | 0.129  | 0.122  | 0.146  | 0.240  | 2  | 2  |
| 3141   | 28    | MON | K4 III        | 5.099 | 3.139  | 2.711  | 2.784  | 2.161  | 0.624  | 0.752  | 1.178  | 1.605  | 1.953  | 2.115  | 2.387  | 2.654  | 2  | 2  |
| 3145   |       |     | K2 III        | 4.729 | 2.379  | 2.057  | 2.134  | 1.752  | 0.558  | 0.625  | 0.982  | 1.320  | 1.602  | 1.737  | 1.963  | 2.223  | 3  | 2  |
| 3148   | A2    |     |               | 5.999 | 0.119  | 0.096  | 0.094  | 0.047  | 0.013  | 0.017  | 0.011  |        |        |        |        |        | 57 | 0  |
| 3153   | MO II |     |               | 5.650 | 3.510  | 3.130  | 3.100  | 2.600  | 0.860  | 0.830  | 1.390  |        |        |        |        |        | 1  | 0  |
| 3159   |       |     | B3 V          | 4.800 | -1.110 | -1.010 | -0.670 | -0.220 | -0.050 | -0.060 | -0.110 |        |        |        |        |        | 1  | 0  |
| 3165   | ZET   | PUP | 05F           | 2.243 | -1.826 | -1.691 | -1.083 | -0.381 | -0.122 | -0.051 | -0.089 | -0.168 | -0.221 | -0.281 | -0.449 | -0.456 | 2  | 1  |
| 3173   | 27    | LYN | A2 V          | 4.842 | 0.091  | 0.065  | 0.031  | 0.015  | 0.005  | 0.014  | -0.031 | 0.042  | 0.047  | 0.048  | 0.064  | 0.042  | 3  | 3  |
| 3180   | RHO   | PUP | F6 IIP        | 2.881 | 0.545  | 0.430  | 0.433  | 0.496  | 0.190  | 0.232  | 0.358  | 0.495  | 0.583  | 0.610  | 0.638  | 0.722  | 1  | 1  |
| 3188   | ZET   | MON | G2 IB         | 4.582 | 1.528  | 1.295  | 1.293  | 1.259  | 0.481  | 0.456  | 0.711  | 0.969  | 1.154  | 1.251  | 1.404  | 1.573  | 3  | 2  |
| 3192   | 16    | PUP | B5 V          | 4.394 | -1.017 | -0.922 | -0.639 | -0.217 | -0.044 | -0.037 | -0.079 | -0.081 | -0.159 | -0.182 | -0.277 | -0.321 | 3  | 3  |
| 3207   | GAM   | VEL | W7+07:        | 1.877 | -1.726 | -1.582 | -1.015 | -0.341 | -0.265 | 0.229  | -0.033 | 0.018  | -0.062 | -0.061 | 0.043  | -0.138 | 2  | 1  |
| 3211   | 19    | PUP | K0 III        | 4.963 | 1.430  | 1.285  | 1.367  | 1.238  | 0.425  | 0.463  | 0.719  | 0.958  | 1.164  | 1.295  | 1.398  | 1.567  | 3  | 2  |
| 3223   | EPS   | VOL | B6 IV         | 4.350 | -0.790 | -0.740 | -0.500 | -0.170 | -0.040 | 0.040  | -0.060 |        |        |        |        |        | 1  | 0  |
| 3249   | BET   | CNC | K4 III        | 3.945 | 3.116  | 2.709  | 2.773  | 2.179  | 0.644  | 0.752  | 1.169  | 1.559  | 1.897  | 2.059  | 2.316  | 2.567  | 99 | 54 |
| 3275   | 31    | LYN | K5 III        | 4.693 | 3.342  | 2.891  | 2.928  | 2.296  | 0.656  | 0.806  | 1.228  | 1.671  | 2.051  | 2.229  | 2.506  | 2.822  | 3  | 2  |
| 3307   | EPS   | CAR | K0 II+8       | 2.255 | 0.782  | 0.881  | 1.177  | 1.440  | 0.629  | 0.759  | 1.166  | 1.568  | 1.931  | 2.112  | 2.417  | 2.691  | 4  | 1  |
| 3314   |       |     | A0 V          | 3.909 | -0.077 | -0.057 | -0.009 | -0.016 | -0.010 | 0.005  | -0.001 | -0.008 | -0.008 | -0.003 | -0.007 | 0.023  | 4  | 2  |
| 3318   | ALP   | CHA | F6 IV         | 4.194 | 0.222  | 0.159  | 0.268  | 0.450  | 0.202  | 0.211  | 0.367  | 0.490  | 0.605  | 0.631  | 0.671  | 0.774  | 1  | 1  |
| 3323   | OMI   | UMA | G4 II-III     | 3.588 | 1.181  | 0.974  | 1.062  | 1.078  | 0.407  | 0.395  | 0.648  | 0.887  | 1.092  | 1.160  | 1.257  | 1.403  | 3  | 2  |
| 3347   | BET   | VOL | K2 III        | 4.075 | 2.031  | 1.807  | 1.873  | 1.546  | 0.484  | 0.566  | 0.868  | 1.209  | 1.471  | 1.602  | 1.784  | 1.996  | 4  | 1  |
| 3371   |       |     | B5 IV         | 6.370 | -0.800 | -0.750 | -0.530 | -0.100 | 0.030  | 0.030  | 0.040  |        |        |        |        |        | 4  | 0  |
| 3403   | PI 2  | UMA | K2 III        | 4.932 | 2.137  | 1.869  | 1.959  | 1.624  | 0.509  | 0.581  | 0.919  | 1.188  | 1.455  | 1.599  | 1.803  | 2.001  | 3  | 4  |
| 3415   |       |     | B3 VN         | 5.240 | -1.020 | -0.960 | -0.610 | -0.200 | -0.040 | -0.050 | -0.070 |        |        |        |        |        | 4  | 0  |
| 3418   | SIG   | HYA | K2 III        | 4.739 | 2.333  | 2.091  | 2.115  | 1.730  | 0.551  | 0.578  | 0.904  | 1.177  | 1.439  | 1.572  | 1.764  | 2.003  | 2  | 4  |
| 3429   | EPS   | CNC | AM            | 6.374 | 0.380  | 0.301  | 0.259  | 0.209  | 0.053  | 0.087  | 0.145  | 0.227  | 0.252  | 0.302  | 0.341  | 0.587  | 1  | 1  |
| 3438   | BET   | PYX | G4 III        | 4.136 | 1.411  | 1.202  | 1.281  | 1.212  | 0.457  | 0.403  | 0.656  | 0.923  | 1.116  | 1.189  | 1.338  | 1.512  | 1  | 1  |
| 3441   | 9     | HYA | K3 IAB        | 5.145 | 1.753  | 1.572  | 1.644  | 1.407  | 0.483  | 0.511  | 0.813  | 1.044  | 1.283  | 1.415  | 1.582  | 1.765  | 2  | 2  |
| 3445   |       |     | F2 IA         | 4.009 | 1.673  | 1.338  | 0.664  | 0.743  | 0.401  | 0.370  | 0.608  | 0.904  | 1.107  | 1.322  | 1.492  | 1.619  | 1  | 1  |
| 3447   | OMI   | VEL | B3 IV         | 3.577 | -1.065 | -0.980 | -0.671 | -0.235 | -0.058 | -0.046 | -0.088 | -0.136 | -0.181 | -0.219 | -0.301 | -0.318 | 4  | 1  |
| 3449   | GAM   | CNC | A1 V          | 4.713 | 0.031  | 0.012  | 0.053  | 0.013  | 0.003  | 0.030  | 0.032  | 0.014  | 0.021  | 0.026  | 0.039  | 0.611  | 2  | 2  |
| 3454   | ETA   | HYA | B3 V          | 4.275 | -1.240 | -1.138 | -0.749 | -0.248 | -0.056 | -0.061 | -0.100 | -0.167 | -0.209 | -0.252 | -0.373 | -0.400 | 99 | 24 |
| 3457   |       |     | B5 III        | 4.340 | -1.300 | -1.220 | -0.800 | -0.200 | -0.020 | -0.020 | -0.030 |        |        |        |        |        | 1  | 0  |
| 3459   | 31    | MON | G2 IB         | 4.842 | 1.140  | 0.985  | 1.028  | 1.040  | 0.411  | 0.408  | 0.645  | 0.871  | 1.064  | 1.124  | 1.272  | 1.408  | 2  | 2  |
| 3461   | DEL   | CNC | K0 III        | 4.238 | 1.838  | 1.648  | 1.731  | 1.457  | 0.479  | 0.530  | 0.837  | 1.079  | 1.339  | 1.444  | 1.606  | 1.806  | 2  | 2  |
| 3462   |       |     | B3 VN         | 5.550 | -1.530 | -1.370 | -0.900 | -0.250 | -0.060 | 0.000  | 0.040  |        |        |        |        |        | 3  | 0  |
| 3467   |       |     | B4 IV         | 4.820 | -1.160 | -1.030 | -0.700 | -0.280 | -0.100 | -0.080 | -0.100 |        |        |        |        |        | 4  | 0  |
| 3468   | ALF   | PYX | B1.5III       | 3.669 | -1.407 | -1.287 | -0.812 | -0.233 | -0.041 | -0.075 | -0.106 | -0.143 | -0.177 | -0.247 | -0.372 | -0.368 | 1  | 1  |
| 3474/5 | 10T   | CNC | G8 II/A3 V    | 4.290 | 1.553  | 1.366  | 1.420  | 1.297  | 0.465  | 0.450  | 0.758  | 0.921  | 1.155  | 1.285  | 1.415  | 1.594  | 2  | 3  |
| 3482 D | EPS   | HYA | G0 III-IV+DF7 | 3.574 | 0.838  | 0.715  | 0.805  | 0.810  | 0.301  | 0.354  | 0.599  | 0.791  | 0.971  | 1.063  | 1.167  | 1.316  | 2  | 2  |
| 3484   | 12    | HYA | G8 III        | 4.533 | 1.302  | 1.089  | 1.213  | 1.155  | 0.435  | 0.419  | 0.695  | 0.919  | 1.135  | 1.226  | 1.343  | 1.512  | 2  | 2  |
| 3485   | DEL   | VEL | A0 V          | 1.950 | 0.120  | 0.120  | 0.120  | 0.060  | 0.030  | 0.040  | 0.040  |        |        |        |        |        | 3  | 0  |
| 3487   |       |     | A0 III        | 3.937 | 0.412  | 0.340  | 0.158  | 0.005  | 0.056  | 0.018  | 0.045  | 0.066  | 0.082  | 0.156  | 0.198  | 0.200  | 1  | 1  |
| 3494   |       |     | B3 IA         | 5.600 | -0.570 | -0.510 | -0.260 | 0.260  | 0.230  | 0.190  | 0.340  |        |        |        |        |        | 4  | 0  |
| 3498   |       |     | B3 VNE        | 4.500 | -1.270 | -1.130 | -0.760 | -0.290 | -0.100 | -0.080 | -0.010 |        |        |        |        |        | 4  | 0  |
| 3539   |       |     | B6+VN         | 5.860 | -0.960 | -0.880 | -0.580 | -0.230 | -0.040 | -0.050 | -0.070 |        |        |        |        |        | 4  | 0  |
| 3547   | ZET   | HYA | G8 III        | 3.378 | 1.593  | 1.407  | 1.490  | 1.319  | 0.472  | 0.462  | 0.749  | 0.974  | 1.217  | 1.321  | 1.466  | 1.640  | 2  | 2  |
| 3569   | 10T   | UMA | A7 V          | 3.229 | 0.188  | 0.152  | 0.214  | 0.246  | 0.082  | 0.111  | 0.185  | 0.258  | 0.310  | 0.323  | 0.340  | 0.398  | 2  | 2  |
| 3571   |       |     | B8 II         | 3.851 | -0.728 | -0.669 | -0.472 | -0.152 | -0.030 | -0.020 | -0.035 | -0.063 | -0.073 | -0.087 | -0.166 | 0.022  | 4  | 1  |
| 3572   | ALF   | CNC | AM            | 4.322 | 0.322  | 0.284  | 0.232  | 0.191  | 0.069  | 0.088  | 0.113  | 0.059  | 0.050  | 0.038  | 0.074  | 0.185  | 2  | 1  |
| 3574   |       |     | B5 V          | 4.670 | -0.900 | -0.810 | -0.510 | -0.170 | -0.040 | -0.040 | -0.060 |        |        |        |        |        | 1  | 0  |
| 3576   | RHO   | UMA | M3 IIIB       | 5.153 | 3.529  | 2.981  | 2.861  | 2.278  | 0.726  | 0.697  | 1.265  | 1.852  | 2.472  | 2.738  | 3.172  | 3.569  | 2  | 1  |
| 3579   |       |     | F5 V          | 4.114 | 0.244  | 0.188  | 0.345  | 0.493  | 0.208  | 0.251  | 0.415  | 0.525  | 0.647  | 0.693  | 0.734  | 0.789  | 2  | 3  |
| 3582   |       |     | B3 IV         | 4.910 | -1.320 | -1.170 | -0.800 | -0.310 | -0.110 | -0.100 | -0.100 |        |        |        |        |        | 4  | 0  |
| 3594   | KAP   | UMA | B9N           | 3.607 | 0.071  | 0.057  | -0.093 | -0.040 | 0.002  | 0.030  | 0.046  | 0.062  | 0.071  | 0.089  | 0.121  | 0.120  | 3  | 2  |
| 3612   |       |     | G8 IB-II      | 4.803 | 1.652  | 1.431  | 1.476  | 1.381  | 0.509  | 0.465  | 0.757  | 1.000  | 1.218  | 1.312  | 1.456  | 1.637  | 3  | 1  |

## THIRTEEN-COLOR PHOTOMETRY OF 1380 BRIGHT STARS

TABLE 7 (CONTINUED)

| B.S.    | NAME  | SP. TYPE | 52           | 33-52 | 35-52  | 37-52  | 40-52  | 45-52  | 52-58  | 52-63  | 52-72  | 52-80  | 52-86  | 52-99  | 52-110 | NB     | NR  |
|---------|-------|----------|--------------|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|-----|
| 3731    | KAP   | LED      | K2 III       | 4.760 | 2.290  | 2.033  | 2.125  | 1.708  | 0.499  | 0.615  | 0.949  | 1.275  | 1.553  | 1.699  | 1.888  | 2.085  | 1 2 |
| 3734    | KAP   | VEL      | B2 IV-V      | 2.461 | -1.236 | -1.150 | -0.774 | -0.258 | -0.059 | -0.073 | -0.127 | -0.119 | -0.169 | -0.204 | -0.336 | -0.345 | 6 1 |
| 3748    | ALF   | HYA      | K3 IIIA      | 2.384 | 2.969  | 2.611  | 2.688  | 2.114  | 0.621  | 0.719  | 1.096  | 1.452  | 1.775  | 1.923  | 2.168  | 2.378  | 1 2 |
| 3750    |       |          | G2 V         | 5.583 | 0.503  | 0.387  | 0.588  | 0.718  | 0.304  | 0.363  | 0.575  | 0.774  | 0.954  | 1.013  | 1.090  | 1.206  | 1 2 |
| 3751    |       |          | K3 III       | 4.660 | 3.065  | 2.698  | 2.717  | 2.188  | 0.660  | 0.726  | 1.112  | 1.476  | 1.810  | 1.956  | 2.193  | 2.436  | 2 3 |
| 3757    | 23    | UMA      | F0 IV        | 3.750 | 0.343  | 0.245  | 0.272  | 0.382  | 0.160  | 0.176  | 0.301  | 0.418  | 0.532  | 0.566  | 0.599  | 0.633  | 2 2 |
| 3759    | TAU 1 | HYA      | F6 V         | 4.715 | 0.224  | 0.155  | 0.333  | 0.519  | 0.243  | 0.230  | 0.391  | 0.539  | 0.656  | 0.680  | 0.727  | 0.787  | 2 2 |
| 3771    | 24    | UMA      | G2 IV        | 4.736 | 0.896  | 0.721  | 0.897  | 0.954  | 0.383  | 0.369  | 0.623  | 0.798  | 1.008  | 1.077  | 1.183  | 1.351  | 3 2 |
| 3773    | LAM   | LED      | K5 III       | 4.751 | 3.397  | 2.931  | 2.958  | 2.312  | 0.652  | 0.779  | 1.241  | 1.709  | 2.107  | 2.283  | 2.567  | 2.815  | 2 3 |
| 3775    | THE   | UMA      | F6 IV        | 3.306 | 0.266  | 0.187  | 0.327  | 0.547  | 0.253  | 0.232  | 0.425  | 0.551  | 0.691  | 0.729  | 0.773  | 0.871  | 2 2 |
| 3786 D  | PSI   | VEL      | F2 IV        | 3.668 | 0.270  | 0.197  | 0.294  | 0.460  | 0.212  | 0.153  | 0.289  | 0.165  | 0.269  | 0.292  | 0.322  | 0.356  | 1 1 |
| 3800    | 10    | LMI      | G8 III       | 4.764 | 1.295  | 1.128  | 1.216  | 1.168  | 0.431  | 0.426  | 0.702  | 0.890  | 1.092  | 1.190  | 1.326  | 1.519  | 4 2 |
| 3803 V  | N     | VEL      | K5 III       | 3.603 | 3.280  | 2.902  | 2.912  | 2.301  | 0.646  | 0.802  | 1.227  | 1.706  | 2.115  | 2.291  | 2.590  | 2.819  | 5 1 |
| 3809    |       |          | K0 III       | 5.038 | 1.527  | 1.316  | 1.420  | 1.299  | 0.469  | 0.475  | 0.766  | 0.988  | 1.218  | 1.315  | 1.477  | 1.694  | 2 2 |
| 3815    | 11    | LMI      | G0 IV-V      | 5.602 | 0.837  | 0.775  | 0.977  | 0.965  | 0.342  | 0.417  | 0.653  | 0.852  | 1.042  | 1.091  | 1.198  | 1.337  | 2 2 |
| 3816 V  | R     | CAR      | GMS E        | 5.871 | 3.120  | 1.426  | 0.896  | 0.609  | 1.166  | 0.081  | 1.354  | 2.713  | 3.589  | 4.018  | 4.623  | 4.749  | 1 1 |
| 3825    |       |          | B5 II        | 4.120 | -0.790 | -0.730 | -0.540 | -0.070 | 0.040  | 0.030  | 0.080  |        |        |        |        |        | 1 0 |
| 3834    |       |          | K3 III       | 5.034 | 2.654  | 2.290  | 2.376  | 1.899  | 0.573  | 0.671  | 1.067  | 1.392  | 1.692  | 1.838  | 2.067  | 2.351  | 2 2 |
| 3845    | IOT   | HYA      | K3 III       | 4.240 | 2.569  | 2.249  | 2.333  | 1.878  | 0.587  | 0.646  | 1.034  | 1.341  | 1.629  | 1.771  | 1.994  | 2.241  | 2 2 |
| 3849    | KAP   | HYA      | B5 V         | 5.048 | -0.990 | -0.888 | -0.585 | -0.184 | -0.041 | -0.045 | -0.070 | -0.123 | -0.165 | -0.176 | -0.272 | -0.319 | 2 2 |
| 3852    | OMI   | LED      | A5 +F6II-III | 3.668 | 0.556  | 0.468  | 0.509  | 0.611  | 0.240  | 0.251  | 0.417  | 0.496  | 0.644  | 0.692  | 0.743  | 0.847  | 2 2 |
| 3856    |       |          | B9 V         | 4.570 | -0.390 | -0.310 | -0.150 | -0.060 | -0.010 | -0.020 | -0.010 |        |        |        |        |        | 5 0 |
| 3860    |       |          | B5 IV        | 5.060 | -1.010 | -0.960 | -0.610 | -0.230 | -0.070 | -0.070 | -0.070 |        |        |        |        |        | 4 0 |
| 3873    | EPS   | LED      | G0 II        | 3.190 | 1.105  | 0.878  | 0.943  | 1.006  | 0.377  | 0.386  | 0.627  | 0.817  | 1.025  | 1.098  | 1.191  | 1.314  | 2 2 |
| 3875    |       |          | A0 V         | 5.530 | -0.180 | -0.170 | -0.120 | -0.100 | -0.030 | -0.010 | -0.040 |        |        |        |        |        | 4 0 |
| 3881    | 15    | LMI      | G1 V         | 5.246 | 0.500  | 0.396  | 0.586  | 0.723  | 0.284  | 0.304  | 0.497  | 0.649  | 0.810  | 0.857  | 0.932  | 1.026  | 2 2 |
| 3884 V  | I     | CAR      | C62 CEP.     | 4.475 | 2.728  | 2.424  | 2.382  | 2.055  | 0.686  | 0.745  | 1.085  | 1.393  | 1.669  | 1.778  | 1.997  | 2.163  | 1 1 |
| 3886    |       |          | B3 V         | 5.550 | -1.240 | -1.140 | -0.750 | -0.230 | -0.040 | -0.080 | -0.130 |        |        |        |        |        | 4 0 |
| 3888    | UPS   | UMA      | F2 IV        | 3.852 | 0.326  | 0.238  | 0.220  | 0.306  | 0.141  | 0.162  | 0.282  | 0.358  | 0.462  | 0.486  | 0.524  | 0.535  | 2 2 |
| 3890/1  | UPS   | CAR      | A9 II        | 3.062 | 0.743  | 0.658  | 0.598  | 0.229  | 0.139  | 0.184  | 0.259  | 0.446  | 0.539  | 0.676  | 0.765  | 0.795  | 4 1 |
| 3894 D  | PHI   | UMA      | A3 S         | 4.595 | 0.168  | 0.151  | 0.081  | 0.036  | 0.029  | 0.020  | 0.042  | 0.048  | 0.071  | 0.065  | 0.083  | 0.044  | 2 2 |
| 3903    | UPS 1 | HYA      | G8 III       | 4.339 | 1.394  | 1.222  | 1.303  | 1.217  | 0.443  | 0.431  | 0.693  | 0.930  | 1.141  | 1.223  | 1.345  | 1.494  | 2 2 |
| 3905    | MU    | LED      | K2 III       | 4.229 | 2.416  | 2.206  | 2.230  | 1.751  | 0.487  | 0.629  | 0.961  | 1.218  | 1.496  | 1.621  | 1.806  | 2.018  | 2 2 |
| 3925    |       |          | B4 V         | 5.620 | -0.870 | -0.770 | -0.390 | -0.160 | -0.030 | -0.060 | -0.100 |        |        |        |        |        | 4 0 |
| 3940    | PHI   | VEL      | B5 IB        | 3.535 | -0.941 | -0.862 | -0.651 | -0.146 | -0.027 | -0.022 | -0.032 | -0.010 | -0.042 | -0.021 | -0.125 | 0.032  | 4 1 |
| 3950    | PI    | LED      | M2 III       | 5.116 | 3.611  | 3.102  | 3.055  | 2.399  | 0.736  | 0.770  | 1.263  | 1.922  | 2.414  | 2.621  | 2.956  | 3.243  | 2 2 |
| 3970    | UPS 2 | HYA      | B8 V         | 4.550 | -0.436 | -0.373 | -0.314 | -0.130 | -0.010 | -0.035 | -0.052 | -0.085 | -0.091 | -0.106 | -0.142 | -0.142 | 3 2 |
| 3974    | 21    | LMI      | A7 V         | 4.539 | 0.200  | 0.181  | 0.223  | 0.245  | 0.089  | 0.080  | 0.130  | 0.184  | 0.247  | 0.236  | 0.274  | 0.291  | 3 2 |
| 3975    | ETA   | LED      | A0 IB        | 3.551 | -0.212 | -0.248 | -0.445 | -0.099 | 0.019  | 0.049  | 0.067  | 0.081  | 0.098  | 0.153  | 0.124  | 0.097  | 3 2 |
| 3980    | 31    | LED      | K4 III       | 4.762 | 3.055  | 2.659  | 2.710  | 2.124  | 0.609  | 0.760  | 1.162  | 1.544  | 1.888  | 2.045  | 2.294  | 2.548  | 3 2 |
| 3981    | ALF   | SEX      | A0 III       | 4.479 | -0.055 | -0.039 | -0.138 | -0.046 | 0.015  | -0.013 | -0.045 | -0.042 | -0.028 | -0.044 | -0.056 | 3 2    |     |
| 3982    | ALF   | LED      | B7 V         | 1.382 | -0.615 | -0.563 | -0.437 | -0.162 | -0.032 | -0.034 | -0.058 | -0.061 | -0.092 | -0.106 | -0.150 | -0.126 | 3 2 |
| 3990    |       |          | B2 V         | 4.850 | -1.080 | -1.010 | -0.710 | -0.220 | -0.010 | -0.040 | -0.060 |        |        |        |        |        | 4 0 |
| 3994    | LAM   | HYA      | K0 III       | 3.847 | 1.743  | 1.586  | 1.627  | 1.374  | 0.466  | 0.485  | 0.772  | 0.982  | 1.199  | 1.297  | 1.436  | 1.625  | 3 2 |
| 4023    |       |          | A2 V         | 3.845 | 0.119  | 0.108  | 0.119  | 0.068  | 0.019  | 0.012  | 0.010  | 0.062  | 0.057  | 0.056  | 0.058  | 0.117  | 1 1 |
| 4031    | ZET   | LED      | F0 III       | 3.536 | 0.525  | 0.407  | 0.276  | 0.352  | 0.161  | 0.179  | 0.292  | 0.411  | 0.517  | 0.571  | 0.614  | 0.681  | 3 4 |
| 4033    | LAM   | UMA      | A2 IV        | 3.443 | 0.153  | 0.105  | 0.069  | 0.040  | 0.011  | 0.005  | 0.025  | 0.035  | 0.058  | 0.056  | 0.080  | 0.066  | 2 2 |
| 4037    | OMG   | CAR      | B8 III       | 3.313 | -0.367 | -0.350 | -0.410 | -0.127 | -0.016 | -0.033 | -0.028 | -0.027 | -0.037 | 0.000  | -0.063 | -0.041 | 4 1 |
| 4038    |       |          | B3           | 6.100 | -1.240 | -1.090 | -0.710 | -0.190 | -0.020 | -0.030 | -0.040 |        |        |        |        |        | 4 0 |
| 4039    | 39    | LED      | D F3         | 5.902 | 0.256  | 0.135  | 0.308  | 0.568  | 0.242  | 0.228  | 0.409  | 0.588  | 0.746  | 0.828  | 0.869  | 0.953  | 2 2 |
| 4050    |       |          | K5 IB        | 3.796 | 3.000  | 2.738  | 2.737  | 2.252  | 0.716  | 0.763  | 1.140  | 1.526  | 1.865  | 2.034  | 2.305  | 2.555  | 4 1 |
| 4054    | 40    | LED      | F6 IV        | 4.903 | 0.219  | 0.173  | 0.341  | 0.510  | 0.218  | 0.226  | 0.373  | 0.537  | 0.698  | 0.698  | 0.754  | 0.802  | 2 2 |
| 4057/8  | GAM   | LED      | K0 IIIP      | 2.303 | 1.909  | 1.625  | 1.733  | 1.511  | 0.520  | 0.528  | 0.853  | 1.198  | 1.670  | 1.609  | 1.805  | 1.977  | 3 4 |
| 4069    | MU    | UMA      | M0 III       | 3.489 | 3.303  | 2.845  | 2.876  | 2.314  | 0.686  | 0.789  | 1.261  | 1.745  | 2.203  | 2.418  | 2.726  | 2.981  | 3 2 |
| 4072    |       |          | A0P          | 4.972 | -0.214 | -0.209 | -0.190 | -0.068 | -0.012 | 0.001  | -0.006 | 0.003  | 0.010  | 0.018  | -0.002 | -0.037 | 3 3 |
| 4074    |       |          | K3 III       | 4.460 | -0.930 | -0.860 | -0.630 | -0.200 | -0.040 | -0.040 | -0.080 |        |        |        |        |        | 1 0 |
| 4090    | 30    | LMI      | F0 V         | 4.802 | 0.367  | 0.344  | 0.282  | 0.299  | 0.120  | 0.164  | 0.237  | 0.325  | 0.425  | 0.450  | 0.491  | 0.534  | 2 4 |
| 4092    |       |          | M0 III       | 5.995 | 3.362  | 2.890  | 2.877  | 2.238  | 0.637  | 0.771  | 1.232  | 1.758  | 2.166  | 2.355  | 2.648  | 2.923  | 2 2 |
| 4094    | MU    | HYA      | K4 III       | 4.205 | 3.206  | 2.795  | 2.809  | 2.201  | 0.625  | 0.778  | 1.195  | 1.601  | 1.954  | 2.125  | 2.378  | 2.647  | 2 2 |
| 4100 D  | BET   | LMI      | G8 III-IV    | 4.402 | 1.300  | 1.161  | 1.271  | 1.184  | 0.430  | 0.445  | 0.714  | 0.927  | 1.154  | 1.252  | 1.395  | 1.522  | 2 2 |
| 4102    |       |          | F3 IV-V      | 4.093 | 0.176  | 0.106  | 0.254  | 0.402  | 0.178  | 0.172  | 0.286  | 0.426  | 0.537  | 0.556  | 0.572  | 0.691  | 2 1 |
| 4112    | 36    | UMA      | F8 V         | 4.947 | 0.234  | 0.176  | 0.388  | 0.601  | 0.276  | 0.277  | 0.462  | 0.659  | 0.804  | 0.855  | 0.905  | 1.058  | 2 2 |
| 4114    |       |          | F0 II        | 3.850 | 0.847  | 0.705  | 0.312  | 0.311  | 0.146  | 0.176  | 0.277  | 0.418  | 0.511  | 0.573  | 0.651  | 0.760  | 2 1 |
| 4132    |       |          | A7 IV        | 4.766 | 0.200  | 0.190  | 0.219  | 0.259  | 0.107  | 0.106  | 0.182  | 0.245  | 0.312  | 0.329  | 0.370  | 0.384  | 2 3 |
| 4133    | RHO   | LED      | B1 IB        | 3.813 | -1.459 | -1.344 | -0.906 | -0.224 | -0.013 | -0.037 | -0.036 | -0.094 | -0.118 | -0.159 | -0.266 | -0.302 | 2 2 |
| 4138    |       |          | A2 V         | 4.760 | 0.140  | 0.120  | 0.100  | 0.020  | 0.010  | 0.010  | 0.000  |        |        |        |        |        | 1 0 |
| 4140    |       |          | B4 VNE       | 3.312 | -1.076 | -1.006 | -0.686 | -0.167 | -0.027 | -0.024 | 0.020  | 0.098  | 0.141  | 0.076  | -0.028 | 0.050  | 4 1 |
| 4163 V. | U     | HYA      | G7,3         | 5.627 | 12.    | 8.900  | 7.922  | 3.309  | 1.500  | 1.238  | 1.882  | 2.381  | 2.846  | 3.338  | 3.720  | 4.161  | 1 3 |
| 4166    | 37    | LMI      | G3 II:       | 4.865 | 1.181  | 0.971  | 1.002  | 1.037  | 0.394  | 0.372  | 0.617  | 0.823  | 1.004  | 1.076  | 1.193  | 1.303  | 2 3 |
| 4167 D  |       |          | F4 IV+A1 V   | 3.919 | 0.210  | 0.165  | 0.272  | 0.357  | 0.150  | 0.147  | 0.252  | 0.402  | 0.474  | 0.462  | 0.493  | 0.594  | 1 1 |
| 4174 V  | GAM   | CHA      | M0 III       | 4.621 | 3.434  | 3.019  | 2.967  | 2.325  | 0.675  | 0.822  | 1.274  | 1.811  | 2.233  | 2.376  | 2.704  | 2.960  | 1 1 |
| 4199    | THE   | CAR      | B0.5V P      | 2.739 | -1.612 | -1.512 | -0.990 | -0.319 | -0.066 | -0.099 | -0.156 | -0.185 | -0.225 | -0.280 | -0.472 | -0.505 | 5 1 |
| 4204    |       |          | B5: V        | 5.780 | -0.810 | -0.7   |        |        |        |        |        |        |        |        |        |        |     |

TABLE 7 (CONTINUED)

| B.S.   | NAME | SP. TYPE | 52           | 33-52 | 35-52  | 37-52  | 40-52  | 45-52  | 52-58  | 52-63  | 52-72  | 52-80  | 52-86  | 52-99  | 52-110 | N8     | NR    |
|--------|------|----------|--------------|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|-------|
| 4357   | DEL  | LED      | A4 V         | 2.611 | 0.238  | 0.199  | 0.185  | 0.153  | 0.051  | 0.067  | 0.099  | 0.192  | 0.236  | 0.222  | 0.240  | 0.239  | 3 3   |
| 4359   | THE  | LED      | A2 V         | 3.351 | 0.082  | 0.067  | -0.008 | -0.021 | -0.008 | 0.014  | 0.022  | 0.072  | 0.068  | 0.079  | 0.085  | 0.077  | 3 2   |
| 4362   | T2   | LED      | M3 III       | 5.010 | 3.566  | 3.053  | 2.939  | 2.380  | 0.822  | 0.691  | 1.266  | 2.069  | 2.647  | 2.668  | 3.250  | 3.544  | 3 3   |
| 4368   | PH1  | LED      | A7 III-IV    | 4.515 | 0.397  | 0.324  | 0.208  | 0.236  | 0.114  | 0.120  | 0.175  | 0.236  | 0.313  | 0.337  | 0.374  | 0.444  | 3 2   |
| 4371   | 75   | LED      | M0 IIIB      | 5.575 | 3.297  | 2.856  | 2.850  | 2.210  | 0.626  | 0.760  | 1.207  | 1.729  | 2.165  | 2.358  | 2.620  | 2.899  | 1 2   |
| 4374/5 | XI   | UMA      | G0 V         | 3.900 | 0.298  | 0.202  | 0.450  | 0.662  | 0.287  | 0.282  | 0.491  | 0.693  | 0.874  | 0.937  | 1.002  | 1.149  | 2 3   |
| 4377   | NU   | UMA      | K3 III       | 3.839 | 2.753  | 2.397  | 2.456  | 1.996  | 0.624  | 0.682  | 1.072  | 1.421  | 1.736  | 1.884  | 2.108  | 2.311  | 1 3   |
| 4380   | 55   | UMA      | A2 V         | 4.819 | 0.093  | 0.086  | 0.158  | 0.128  | 0.047  | 0.043  | 0.084  | 0.093  | 0.137  | 0.155  | 0.153  | 0.174  | 2 2   |
| 4382   | DEL  | CRT      | G8 III-IV    | 3.871 | 1.913  | 1.635  | 1.720  | 1.479  | 0.518  | 0.522  | 0.863  | 1.091  | 1.358  | 1.480  | 1.661  | 1.885  | 2 2   |
| 4386   | SIG  | LED      | B9 V         | 4.086 | -0.233 | -0.215 | -0.186 | -0.087 | -0.019 | 0.005  | 0.009  | -0.029 | -0.024 | -0.035 | -0.034 | -0.072 | 2 2   |
| 4390   | PI   | CEN      | B5 VN        | 3.880 | -1.080 | -0.940 | -0.620 | -0.220 | -0.060 | -0.090 | -0.140 |        |        |        |        |        | 4 0   |
| 4392   | 56   | UMA      | G8 III       | 5.199 | 1.597  | 1.396  | 1.457  | 1.319  | 0.471  | 0.447  | 0.720  | 0.940  | 1.171  | 1.281  | 1.420  | 1.576  | 3 2   |
| 4399 D | IOT  | LED      | F2 IV        | 4.640 | 0.309  | 0.232  | 0.338  | 0.471  | 0.219  | 0.211  | 0.333  | 0.464  | 0.587  | 0.621  | 0.665  | 0.767  | 2 2   |
| 4405 D | GAM  | CRT      | A5 V         | 4.143 | 0.242  | 0.198  | 0.237  | 0.238  | 0.087  | 0.110  | 0.174  | 0.216  | 0.281  | 0.279  | 0.318  | 0.410  | 2 2   |
| 4406   |      |          | B3 III       | 5.640 | -0.080 | -0.840 | -0.510 | -0.050 | 0.060  | 0.040  | 0.060  |        |        |        |        |        | 4 0   |
| 4415   |      |          | B5 IV        | 5.290 | -0.890 | -0.840 | -0.590 | -0.180 | 0.000  | -0.020 | -0.040 |        |        |        |        |        | 4 0   |
| 4434   | LAM  | DRA      | M0 III       | 4.271 | 3.008  | 3.062  | 3.066  | 2.415  | 0.703  | 0.804  | 1.291  | 1.809  | 2.277  | 2.466  | 2.772  | 2.989  | 3 2   |
| 4441   | OM1  | CEN      | G0 IA        | 5.510 | 1.970  | 1.670  | 1.350  | 1.300  | 0.540  | 0.570  | 0.870  |        |        |        |        |        | 4 0   |
| 4442   |      |          | A2 IA        | 5.300 | 0.590  | 0.450  | 0.130  | 0.440  | 0.290  | 0.280  | 0.460  |        |        |        |        |        | 4 0   |
| 4450   | XI   | HYA      | G7 III       | 3.798 | 1.444  | 1.242  | 1.375  | 1.238  | 0.427  | 0.452  | 0.735  | 0.954  | 1.165  | 1.264  | 1.383  | 1.536  | 1 1   |
| 4456 D | 90A  | B LED    | B3 V         | 5.914 | -1.111 | -1.011 | -0.643 | -0.215 | -0.053 | -0.062 | -0.093 | -0.139 | -0.170 | -0.215 | -0.310 | -0.362 | 53 12 |
| 4460   |      |          | B9 V         | 4.600 | -0.340 | -0.300 | -0.260 | -0.120 | -0.030 | -0.030 | -0.040 |        |        |        |        |        | 1 0   |
| 4467   | LAM  | CEN      | B9 III       | 3.149 | -0.055 | -0.054 | -0.274 | -0.098 | -0.002 | -0.002 | -0.021 | 0.005  | 0.010  | 0.030  | 0.022  | -0.079 | 4 1   |
| 4468   | THE  | CRT      | B9 V         | 4.661 | -0.280 | -0.246 | -0.218 | -0.103 | -0.018 | -0.032 | -0.048 | -0.073 | -0.085 | -0.095 | -0.110 | -0.125 | 3 2   |
| 4471   | UPS  | LED      | G9 III       | 4.557 | 1.518  | 1.304  | 1.409  | 1.285  | 0.456  | 0.465  | 0.771  | 0.984  | 1.219  | 1.321  | 1.465  | 1.637  | 3 2   |
| 4496   | 61   | UMA      | G8 V         | 5.490 | 0.608  | 0.560  | 0.796  | 0.861  | 0.322  | 0.396  | 0.627  | 0.845  | 1.033  | 1.086  | 1.198  | 1.322  | 5 3   |
| 4514   | ZET  | CRT      | G8 III       | 4.921 | 1.474  | 1.306  | 1.391  | 1.281  | 0.454  | 0.424  | 0.710  | 0.918  | 1.141  | 1.229  | 1.354  | 1.491  | 2 2   |
| 4517   | NU   | VIR      | M1 III       | 4.616 | 3.430  | 2.816  | 2.801  | 2.240  | 0.691  | 0.707  | 1.163  | 1.757  | 2.197  | 2.398  | 2.696  | 2.940  | 2 2   |
| 4518   | CHI  | UMA      | K0 III       | 4.000 | 2.149  | 1.863  | 1.946  | 1.612  | 0.537  | 0.560  | 0.907  | 1.197  | 1.474  | 1.608  | 1.793  | 1.990  | 2 2   |
| 4520   | LAM  | MUS      | A7 III       | 3.691 | 0.275  | 0.280  | 0.226  | 0.176  | 0.057  | 0.069  | 0.096  | 0.203  | 0.243  | 0.235  | 0.260  | 0.299  | 4 1   |
| 4527 D | 93   | LED      | G5III-IV+A   | 4.645 | 0.687  | 0.585  | 0.651  | 0.626  | 0.253  | 0.272  | 0.481  | 0.680  | 0.855  | 0.924  | 1.030  | 1.146  | 3 2   |
| 4534   | BET  | LED      | A3 V         | 2.125 | 0.131  | 0.105  | 0.173  | 0.142  | 0.054  | 0.038  | 0.075  | 0.067  | 0.093  | 0.092  | 0.109  | 0.117  | 10 48 |
| 4537   |      |          | B3 VNE       | 4.340 | -1.080 | -0.970 | -0.660 | -0.220 | -0.060 | -0.070 | -0.120 |        |        |        |        |        | 4 0   |
| 4540   | BET  | VIR      | F8 V         | 3.700 | 0.409  | 0.307  | 0.494  | 0.650  | 0.271  | 0.286  | 0.469  | 0.637  | 0.778  | 0.820  | 0.864  | 0.975  | 6 4   |
| 4549   |      |          | B4 IV        | 4.900 | -1.010 | -0.940 | -0.590 | -0.230 | -0.060 | -0.050 | -0.090 |        |        |        |        |        | 4 0   |
| 4550   |      |          | G8 VP        | 6.627 | 0.557  | 0.417  | 0.738  | 0.873  | 0.348  | 0.391  | 0.656  | 0.895  | 1.101  | 1.186  | 1.305  | 1.436  | 49 40 |
| 4554   | GAM  | UMA      | A0 V         | 2.413 | 0.050  | 0.042  | 0.014  | 0.007  | 0.004  | -0.020 | -0.016 | -0.025 | -0.029 | -0.012 | -0.017 | -0.053 | 2 5   |
| 4573   |      |          | B3 V         | 5.550 | -1.120 | -1.050 | -0.590 | -0.260 | -0.060 | -0.080 | -0.090 |        |        |        |        |        | 4 0   |
| 4583   | EPS  | CHA      | B9 VN        | 4.890 | -0.320 | -0.310 | -0.150 | -0.070 | -0.020 | -0.040 | -0.050 |        |        |        |        |        | 1 0   |
| 4589   | PI   | VIR      | A4 V         | 4.710 | 0.330  | 0.283  | 0.186  | 0.128  | 0.083  | 0.048  | 0.091  | 0.120  | 0.153  | 0.169  | 0.221  | 0.219  | 2 2   |
| 4599   | THE  | 1 CRU    | AM           | 4.390 | 0.240  | 0.180  | 0.220  | 0.280  | 0.140  | 0.130  | 0.230  |        |        |        |        |        | 1 0   |
| 4603   | THE  | 2 CRU    | B2 V         | 4.710 | -1.020 | -0.940 | -0.500 | -0.160 | -0.010 | -0.040 | -0.050 |        |        |        |        |        | 1 0   |
| 4608   | OM1  | VIR      | G8 III       | 4.348 | 1.349  | 1.153  | 1.301  | 1.269  | 0.466  | 0.445  | 0.724  | 0.962  | 1.185  | 1.283  | 1.421  | 1.562  | 3 2   |
| 4618   |      |          | B2 III NE    | 4.470 | -1.230 | -1.090 | -0.710 | -0.240 | -0.070 | -0.080 | -0.130 |        |        |        |        |        | 4 0   |
| 4620   |      |          | A1 V         | 5.300 | 0.080  | 0.110  | 0.050  | -0.010 | 0.030  | 0.010  | 0.030  |        |        |        |        |        | 5 0   |
| 4621 V | DEL  | CEN      | B2 IVNE      | 2.509 | -1.413 | -1.298 | -0.804 | -0.194 | -0.020 | -0.059 | -0.007 | -0.005 | 0.028  | -0.038 | -0.192 | -0.121 | 5 1   |
| 4630   | EPS  | CRV      | K3 III       | 3.368 | 2.641  | 2.326  | 2.385  | 1.919  | 0.591  | 0.667  | 0.999  | 1.352  | 1.618  | 1.756  | 1.987  | 2.188  | 1 1   |
| 4638   | RHO  | CEN      | B3 V         | 3.950 | -1.080 | -1.000 | -0.630 | -0.230 | -0.070 | -0.110 | -0.170 |        |        |        |        |        | 4 0   |
| 4656 V | DEL  | CRU      | B2 IV        | 2.777 | -1.476 | -1.376 | -0.913 | -0.328 | -0.090 | -0.162 | -0.188 | -0.148 | -0.203 | -0.272 | -0.445 | -0.467 | 6 1   |
| 4660   | DEL  | UMA      | A3 V         | 3.340 | 0.156  | 0.133  | 0.144  | 0.107  | 0.033  | 0.038  | 0.070  | 0.051  | 0.098  | 0.113  | 0.112  | 0.083  | 3 5   |
| 4662   | GAM  | CRV      | B8 III       | 2.584 | -0.573 | -0.536 | -0.429 | -0.158 | -0.035 | -0.019 | -0.035 | -0.050 | -0.069 | -0.067 | -0.151 | -0.152 | 19 25 |
| 4674   | BET  | CHA      | B5 VN        | 4.240 | -0.910 | -0.880 | -0.560 | -0.200 | -0.050 | -0.050 | -0.080 |        |        |        |        |        | 1 0   |
| 4679   | ZET  | CRT      | B2.5 V       | 4.020 | -1.150 | -1.090 | -0.710 | -0.270 | -0.060 | -0.100 | -0.170 |        |        |        |        |        | 4 0   |
| 4689   | ETA  | VIR      | A2 V         | 3.904 | 0.122  | 0.090  | 0.060  | 0.006  | 0.009  | 0.038  | 0.057  | 0.000  | 0.016  | 0.005  | 0.029  | 0.086  | 3 2   |
| 4695   | 16   | VIR      | K1 III       | 5.266 | 2.192  | 1.873  | 1.922  | 1.575  | 0.519  | 0.579  | 0.913  | 1.194  | 1.460  | 1.590  | 1.801  | 2.024  | 3 2   |
| 4697   | 11   | COM      | G8 III       | 4.972 | 1.613  | 1.364  | 1.468  | 1.320  | 0.481  | 0.460  | 0.766  | 1.010  | 1.246  | 1.352  | 1.522  | 1.706  | 3 2   |
| 4700   | EPS  | CRU      | GK3          | 3.991 | 2.789  | 2.470  | 2.531  | 1.992  | 0.581  | 0.713  | 1.083  | 1.469  | 1.779  | 1.926  | 2.193  | 2.378  | 4 1   |
| 4707   | 12   | COM      | A5+G5 III    | 4.940 | 0.646  | 0.569  | 0.616  | 0.569  | 0.241  | 0.266  | 0.453  | 0.605  | 0.765  | 0.829  | 0.938  | 1.061  | 3 2   |
| 4716   | 5    | CVN      | G7 III       | 4.960 | 1.317  | 1.108  | 1.174  | 1.145  | 0.425  | 0.409  | 0.670  | 0.867  | 1.072  | 1.155  | 1.300  | 1.454  | 3 2   |
| 4730/1 | ALF  | CRU      | B0.5 IV+B1 V | 0.733 | -1.622 | -1.484 | -1.004 | -0.339 | -0.088 | -0.101 | -0.176 | -0.206 | -0.268 | -0.329 | -0.481 | -0.530 | 4 1   |
| 4732   |      |          | B5 VN        | 4.790 | -1.030 | -0.980 | -0.650 | -0.250 | -0.050 | -0.090 | -0.130 |        |        |        |        |        | 4 0   |
| 4737   | GAM  | COM      | K1 III-IV    | 4.616 | 2.065  | 1.883  | 1.943  | 1.579  | 0.497  | 0.543  | 0.836  | 1.086  | 1.333  | 1.432  | 1.615  | 1.785  | 4 2   |
| 4743   | SIG  | CEN      | B2 V         | 3.870 | -1.310 | -1.220 | -0.800 | -0.290 | -0.070 | -0.100 | -0.170 |        |        |        |        |        | 4 0   |
| 4757   | DEL  | CRU      | B9.5 V+V     | 2.955 | -0.182 | -0.159 | -0.118 | -0.061 | -0.017 | -0.019 | -0.021 | -0.042 | -0.060 | -0.083 | -0.103 | -0.103 | 3 2   |
| 4763 V | GAM  | CRU      | M3 II        | 2.050 | 3.571  | 2.996  | 2.876  | 2.258  | 0.796  | 0.634  | 1.266  | 2.200  | 2.831  | 3.067  | 3.509  | 3.800  | 2 2   |
| 4773   | GAM  | MUS      | B5 V         | 3.843 | -1.030 | -0.982 | -0.636 | -0.242 | -0.065 | -0.072 | -0.120 | -0.122 | -0.164 | -0.208 | -0.315 | -0.326 | 5 1   |
| 4775   | ETA  | CRV      | F0 IV        | 4.380 | 0.163  | 0.117  | 0.263  | 0.425  | 0.196  | 0.192  | 0.300  | 0.441  | 0.537  | 0.542  | 0.576  | 0.667  | 3 2   |
| 4785   | BET  | CVN      | G0 V         | 4.409 | 0.327  | 0.248  | 0.479  | 0.659  | 0.288  | 0.289  | 0.491  | 0.649  | 0.815  | 0.861  | 0.923  | 1.011  | 5 1   |
| 4786   | BET  | CRU      | G5 III       | 2.862 | 1.294  | 1.074  | 1.185  | 1.149  | 0.419  | 0.424  | 0.668  | 0.917  | 1.107  | 1.180  | 1.307  | 1.470  | 1 2   |
| 4787   | KAP  | DRA      | B7P          | 3.850 | -0.964 | -0.919 | -0.605 | -0.182 | -0.029 | -0.035 | -0.001 | -0.072 | -0.047 | -0.094 | -0.203 | -0.232 | 3 3   |
| 4789   | 23   | COM      | A0 III       | 4.791 | 0.001  | 0.009  | -0.021 | -0.019 | 0.005  | 0.014  | 0.002  | 0.017  | 0.026  | 0.045  | 0.045  | 0.085  | 3 2   |
| 4798 V | ALF  | MUS      | B2 IV-V      | 2.654 | -1.394 | -1.292 | -0.844 | -0.308 | -0.080 | -0.104 | -0.174 | -0.169 | -0.242 | -0.309 | -0.443 | -0.465 | 5 1   |
| 4802   | TAU  | CEN      | A2 V         | 3.919 | 0.092  | 0.076  | 0.025  | 0.020  | 0.010  | 0.041  | 0.073  | 0.079  | 0.102  | 0.099  | 0.101  | 0.165  | 1 1   |
| 4813   | CHI  | VIR      | K2 III       | 4.956 | 2.458  | 2.236  | 2.237  | 1.765  |        |        |        |        |        |        |        |        |       |



## THIRTEEN-COLOR PHOTOMETRY OF 1380 BRIGHT STARS

TABLE 7 (CONTINUED)

| B.S.   | NAME      | SP. TYPE   |  | 52      | 33-52  | 35-52  | 37-52  | 40-52  | 45-52  | 52-58  | 52-63  | 52-72  | 52-80  | 52-86  | 52-99  | 52-110 | NB | NR |
|--------|-----------|------------|--|---------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|----|----|
| 4914   | ALF 1 CVN | F0 V/AP    |  | 5.680   | 0.072  | 0.027  | 0.189  | 0.335  | 0.150  | 0.154  | 0.272  | 0.400  | 0.386  | 0.540  | 0.574  | 0.551  | 3  | 1  |
| 4915   | ALF 2 CVN | B9.5 P     |  | 2.948   | -0.572 | -0.545 | -0.386 | -0.149 | -0.077 | 0.015  | -0.015 | -0.070 | -0.124 | -0.107 | -0.171 | -0.220 | 1  | 1  |
| 4920   | 36 COM    | M1 III     |  | 5.193   | 3.460  | 2.968  | 2.992  | 2.335  | 0.657  | 0.787  | 1.254  | 1.814  | 2.252  | 2.432  | 2.730  | 2.995  | 3  | 2  |
| 4923   | DEL MUS   | K2 III     |  | 3.953   | 2.275  | 1.947  | 2.014  | 1.626  | 0.497  | 0.595  | 0.902  | 1.279  | 1.537  | 1.636  | 1.808  | 2.021  | 4  | 1  |
| 4931 D | 78 UHA    | F2 V       |  | 5.008   | 0.219  | 0.159  | 0.284  | 0.423  | 0.195  | 0.188  | 0.308  | 0.437  | 0.548  | 0.573  | 0.602  | 0.641  | 3  | 6  |
| 4932   | EPS VIR   | G9 II-III  |  | 3.080   | 1.427  | 1.255  | 1.331  | 1.209  | 0.434  | 0.440  | 0.706  | 0.937  | 1.148  | 1.232  | 1.354  | 1.511  | 3  | 3  |
| 4933   | XI 1 CEN  | A0 V       |  | 4.860   | -0.020 | -0.080 | 0.040  | 0.050  | 0.020  | 0.020  | 0.020  |        |        |        |        |        | 5  | 0  |
| 4940   |           | B5 V       |  | 4.670   | -1.000 | -0.920 | -0.590 | -0.230 | -0.050 | -0.060 | -0.120 |        |        |        |        |        | 4  | 0  |
| 4942   | XI 2 CEN  | B1.5 V     |  | 4.250   | -1.300 | -1.230 | -0.720 | -0.290 | -0.060 | -0.060 | -0.140 |        |        |        |        |        | 5  | 0  |
| 4954   | 41 COM    | K5 III     |  | 5.225   | 3.267  | 2.834  | 2.858  | 2.227  | 0.622  | 0.787  | 1.224  | 1.683  | 2.038  | 2.213  | 2.469  | 2.700  | 3  | 2  |
| 4963 D | THE VIR   | A1 V       |  | 4.407   | 0.032  | 0.037  | -0.052 | -0.026 | 0.012  | 0.024  | 0.050  | 0.048  | 0.046  | 0.055  | 0.061  | 0.075  | 3  | 2  |
| 4975   |           | B8 V       |  | 4.500   | -0.720 | -0.680 | -0.400 | -0.140 | -0.030 | -0.050 | -0.060 |        |        |        |        |        | 1  | 0  |
| 4983   | BET COM   | G0 V       |  | 4.365   | 0.332  | 0.277  | 0.490  | 0.664  | 0.291  | 0.303  | 0.473  | 0.642  | 0.795  | 0.837  | 0.892  | 0.996  | 4  | 6  |
| 4993   | ETA MUS   | B8 V       |  | 4.760   | -0.670 | -0.620 | -0.360 | -0.140 | -0.040 | -0.080 | -0.080 |        |        |        |        |        | 1  | 0  |
| 5017   | 20 CVN    | F0 II-IIIP |  | 4.788   | 0.480  | 0.415  | 0.352  | 0.373  | 0.137  | 0.190  | 0.255  | 0.352  | 0.417  | 0.436  | 0.477  | 0.533  | 3  | 6  |
| 5019   | 61 VIR    | G6 V       |  | 4.925   | 0.664  | 0.568  | 0.795  | 0.850  | 0.326  | 0.365  | 0.581  | 0.837  | 0.991  | 1.041  | 1.128  | 1.282  | 7  | 9  |
| 5020   | GAM HYA   | G8 III     |  | 3.208   | 1.338  | 1.136  | 1.258  | 1.164  | 0.404  | 0.454  | 0.702  | 0.959  | 1.162  | 1.234  | 1.370  | 1.547  | 1  | 1  |
| 5026   |           | B5 III     |  | 5.490   | -0.760 | -0.710 | -0.430 | -0.190 | -0.050 | -0.040 | -0.090 |        |        |        |        |        | 4  | 0  |
| 5028   | IOT CEN   | A2 V       |  | 2.767   | 0.039  | 0.035  | 0.079  | 0.046  | 0.006  | 0.035  | 0.025  | 0.091  | 0.093  | 0.077  | 0.072  | 0.103  | 1  | 1  |
| 5035   |           | B3 V       |  | 4.490   | -1.030 | -0.960 | -0.600 | -0.220 | -0.050 | -0.080 | -0.150 |        |        |        |        |        | 5  | 0  |
| 5054/5 | ZET UMA   | A2 V       |  | 2.072   | 0.046  | 0.038  | 0.075  | 0.037  | 0.004  | 0.026  | 0.034  | 0.034  | 0.053  | 0.050  | 0.048  | 0.020  | 3  | 3  |
| 5065 V | ALF VIR   | B1 V       |  | 0.952   | -1.559 | -1.438 | -0.937 | -0.319 | -0.094 | -0.063 | -0.113 | -0.180 | -0.234 | -0.296 | -0.454 | -0.511 | 9  | 5  |
| 5062   | 80 UMA    | A5 V       |  | 4.033   | 0.182  | 0.156  | 0.189  | 0.198  | 0.068  | 0.075  | 0.139  | 0.183  | 0.234  | 0.217  | 0.253  | 0.267  | 3  | 4  |
| 5068   | 69 VIR    | K1 III     |  | 5.010   | 1.953  | 1.805  | 1.819  | 1.522  | 0.495  | 0.500  | 0.795  | 1.038  | 1.238  | 1.311  | 1.504  | 1.723  | 3  | 2  |
| 5072   | 70 VIR    | G5 V       |  | 5.172   | 0.666  | 0.559  | 0.776  | 0.886  | 0.349  | 0.352  | 0.577  | 0.788  | 0.963  | 1.029  | 1.106  | 1.227  | 3  | 2  |
| 5080 V | R HYA     | G7 E       |  | 8.920   | 3.340  | 2.330  | 1.290  | 0.957  | 1.578  | 0.977  | 2.706  | 4.311  | 5.982  | 6.567  | 8.485  | 9.191  | 2  | 3  |
| 5089 D | 24 VIR    | G8 III     |  | 4.182   | 2.110  | 1.864  | 1.896  | 1.655  | 0.572  | 0.541  | 0.832  | 1.147  | 1.392  | 1.507  | 1.693  | 1.897  | 1  | 1  |
| 5095   | 78 VIR    | M2+ III    |  | 5.122   | 3.684  | 3.143  | 3.057  | 2.433  | 0.758  | 0.745  | 1.268  | 1.935  | 2.443  | 2.682  | 3.012  | 3.291  | 3  | 2  |
| 5105   | ZET VIR   | A3 VN      |  | 4.938   | -0.039 | -0.082 | 0.006  | 0.006  | -0.015 | 0.079  | 0.039  | 0.052  | 0.031  | 0.045  | 0.048  | 0.048  | 3  | 3  |
| 5107   |           | A3 VN      |  | 3.380   | 0.151  | 0.125  | 0.176  | 0.131  | 0.064  | 0.067  | 0.102  | 0.023  | 0.087  | 0.104  | 0.124  | 0.182  | 3  | 2  |
| 5110   |           | F2 IV      |  | 5.068   | 0.329  | 0.234  | 0.297  | 0.426  | 0.205  | 0.196  | 0.367  | 0.473  | 0.614  | 0.662  | 0.735  | 0.800  | 3  | 3  |
| 5112   | 25 CVN    | A4 V       |  | 4.692   | 0.285  | 0.231  | 0.182  | 0.161  | 0.076  | 0.058  | 0.111  | 0.130  | 0.169  | 0.161  | 0.166  | 0.141  | 3  | 2  |
| 5127 D | 24 CVN    | A7 III     |  | 4.810   | 0.298  | 0.223  | 0.200  | 0.258  | 0.122  | 0.122  | 0.222  | 0.253  | 0.318  | 0.339  | 0.343  | 0.366  | 3  | 2  |
| 5132   | EPS CEN   | B1 III     |  | 2.283   | -1.545 | -1.364 | -0.924 | -0.322 | -0.076 | -0.087 | -0.169 | -0.185 | -0.241 | -0.297 | -0.478 | -0.535 | 5  | 1  |
| 5134   | 83 UMA    | M2 III     |  | 5.057   | 3.615  | 3.088  | 3.063  | 2.433  | 0.769  | 0.754  | 1.276  | 1.944  | 2.436  | 2.631  | 2.961  | 3.171  | 3  | 3  |
| 5185   | TAU BOO   | F7 V       |  | 4.603   | 0.282  | 0.199  | 0.378  | 0.557  | 0.239  | 0.244  | 0.405  | 0.509  | 0.658  | 0.662  | 0.717  | 0.815  | 3  | 2  |
| 5190   | UPS CEN   | B2 IV      |  | 3.342   | -1.463 | -1.329 | -0.857 | -0.301 | -0.073 | -0.081 | -0.145 | -0.216 | -0.268 | -0.334 | -0.475 | -0.499 | 10 | 1  |
| 5191   | ETA UMA   | B3 V       |  | 1.829   | -1.121 | -1.020 | -0.650 | -0.220 | -0.052 | -0.081 | -0.126 | -0.177 | -0.205 | -0.253 | -0.364 | -0.449 | 3  | 3  |
| 5193 V | TAU CEN   | B2 IV-V E  |  | 3.429   | -1.421 | -1.327 | -0.825 | -0.243 | -0.038 | -0.049 | -0.028 | -0.150 | -0.189 | -0.256 | -0.379 | -0.442 | 6  | 1  |
| 5200   | UPS BOO   | K5+ III    |  | 4.459   | 3.314  | 2.856  | 2.882  | 2.254  | 0.621  | 0.783  | 1.218  | 1.692  | 2.090  | 2.260  | 2.536  | 2.782  | 3  | 3  |
| 5206   |           | B4 III     |  | 5.670   | -1.220 | -1.080 | -0.680 | -0.220 | -0.030 | -0.050 | -0.080 |        |        |        |        |        | 5  | 0  |
| 5217   |           | B5 V       |  | 5.960   | -0.660 | -0.570 | -0.360 | -0.020 | 0.060  | 0.040  | 0.070  |        |        |        |        |        | 5  | 0  |
| 5219   |           | G2 V       |  | 5.134   | 3.788  | 3.182  | 3.072  | 2.447  | 0.821  | 0.696  | 1.271  | 2.093  | 2.676  | 2.910  | 3.264  | 3.575  | 3  | 3  |
| 5221   | 4 CEN     | B4 IV      |  | 4.670   | -0.850 | -0.740 | -0.480 | -0.160 | -0.020 | -0.030 | -0.060 |        |        |        |        |        | 5  | 0  |
| 5226   | 10 DRA    | G3 III     |  | 4.940   | 3.603  | 3.001  | 2.900  | 2.293  | 0.793  | 0.646  | 1.243  | 2.131  | 2.749  | 2.998  | 3.382  | 3.650  | 3  | 3  |
| 5231   | ZET CEN   | B2.5 IV    |  | 2.516   | -1.514 | -1.393 | -0.866 | -0.308 | -0.076 | -0.078 | -0.139 | -0.207 | -0.267 | -0.337 | -0.484 | -0.462 | 1  | 1  |
| 5235   | ETA BOO   | G0 IV      |  | 2.807   | 0.549  | 0.480  | 0.577  | 0.703  | 0.272  | 0.301  | 0.492  | 0.627  | 0.786  | 0.823  | 0.867  | 0.982  | 9  | 3  |
| 5248   | PHI CEN   | B2 IV      |  | 3.730   | -1.330 | -1.180 | -0.750 | -0.260 | -0.050 | -0.070 | -0.120 |        |        |        |        |        | 5  | 0  |
| 5249   | UPS 1 CEN | B2 IV-V    |  | 3.790   | -1.280 | -1.140 | -0.720 | -0.260 | -0.050 | -0.070 | -0.120 |        |        |        |        |        | 5  | 0  |
| 5264   | TAU VIR   | A3 III     |  | 4.233   | 0.323  | 0.248  | 0.155  | 0.103  | 0.064  | 0.052  | 0.109  | 0.140  | 0.167  | 0.181  | 0.229  | 0.228  | 3  | 2  |
| 5267   | BET CEN   | B1 III     |  | 0.584   | -1.607 | -1.466 | -0.965 | -0.307 | -0.093 | -0.083 | -0.125 | -0.194 | -0.247 | -0.307 | -0.482 | -0.510 | 2  | 2  |
| 5285   | CHI CEN   | B2 V       |  | 4.290   | -1.286 | -1.090 | -0.640 | -0.240 | -0.040 | -0.080 | -0.111 | -0.145 | -0.177 | -0.226 | -0.334 | -0.449 | 10 | 1  |
| 5287   | PI HYA    | K2 III     |  | 3.516   | 1.971  | 1.707  | 1.823  | 1.506  | 0.479  | 0.558  | 0.850  | 1.165  | 1.413  | 1.526  | 1.706  | 1.892  | 5  | 0  |
| 5288   | THE CEN   | K0 III-IV  |  | 2.806   | 1.649  | 1.420  | 1.554  | 1.337  | 0.470  | 0.775  | 1.024  | 1.263  | 1.364  | 1.521  | 1.688  | 1.881  | 1  | 1  |
| 5291   | ALF DRA   | A0 III     |  | 3.651   | -0.108 | -0.106 | -0.168 | -0.092 | -0.019 | -0.004 | 0.001  | -0.063 | -0.070 | -0.061 | -0.076 | -0.104 | 3  | 3  |
| 5292   |           | B5 IV      |  | 6.340   | -0.780 | -0.670 | -0.370 | -0.020 | 0.050  | 0.060  | 0.110  |        |        |        |        |        | 5  | 0  |
| 5299   |           | M4+4.5 III |  | 5.529   | 3.632  | 2.895  | 2.631  | 2.071  | 0.925  | 0.908  | 1.272  | 2.531  | 3.301  | 3.652  | 4.210  | 4.523  | 3  | 4  |
| 5304   | 12 BOO    | F8 IV      |  | 4.908   | 0.352  | 0.260  | 0.403  | 0.613  | 0.282  | 0.252  | 0.437  | 0.548  | 0.713  | 0.741  | 0.815  | 0.914  | 3  | 2  |
| 5313   | CU VIR    | B9P (SI)   |  | 5.005   | -0.747 | -0.674 | -0.442 | -0.164 | -0.048 | -0.022 | -0.042 | -0.040 | -0.094 | -0.123 | -0.190 | -0.185 | 5  | 3  |
| 5315   | KAP VIR   | K3 III     |  | 4.536   | 2.662  | 2.280  | 2.373  | 1.886  | 0.583  | 0.660  | 1.045  | 1.395  | 1.710  | 1.841  | 2.086  | 2.331  | 3  | 2  |
| 5316   |           | B3 VE      |  | 4.930   | -0.980 | -0.940 | -0.640 | -0.110 | 0.060  | 0.000  | 0.090  |        |        |        |        |        | 4  | 0  |
| 5328/9 | KAP BOO   | F2 V/A7 IV |  | 4.434   | 0.269  | 0.216  | 0.226  | 0.237  | 0.099  | 0.119  | 0.185  | 0.269  | 0.320  | 0.335  | 0.314  | 0.357  | 2  | 2  |
| 5336   | EPS APS   | B3 V       |  | 5.120   | -0.970 | -0.890 | -0.570 | -0.170 | -0.030 | -0.040 | -0.040 |        |        |        |        |        | 4  | 0  |
| 5338   | IOT VIR   | F7 III-IV  |  | 4.195   | 0.319  | 0.230  | 0.391  | 0.588  | 0.277  | 0.253  | 0.419  | 0.602  | 0.730  | 0.793  | 0.838  | 0.926  | 3  | 3  |
| 5340   | ALF BOO   | K2 IIIP    |  | 0.243   | 2.403  | 2.023  | 2.091  | 1.702  | 0.557  | 0.614  | 0.978  | 1.321  | 1.615  | 1.749  | 1.978  | 2.165  | 5  | 12 |
| 5350   | IOT BOO   | A7 V       |  | 4.803   | 0.195  | 0.162  | 0.239  | 0.251  | 0.096  | 0.108  | 0.165  | 0.270  | 0.326  | 0.333  | 0.320  | 0.263  | 3  | 2  |
| 5351   | LAM BOO   | A0P        |  | 4.182   | 0.104  | 0.102  | 0.135  | 0.111  | 0.041  | 0.015  | 0.050  | 0.114  | 0.124  | 0.135  | 0.151  | 0.164  | 3  | 2  |
| 5354   | IOT LUP   | B2.5 IV    |  | 3.514   | -1.215 | -1.120 | -0.711 | -0.235 | -0.087 | -0.089 | -0.153 | -0.205 | -0.241 | -0.301 | -0.401 | -0.451 | 1  | 1  |
| 5359   | LAM VIR   | A6M        |  | 4.542   | 0.224  | 0.181  | 0.198  | 0.159  | 0.056  | 0.061  | 0.090  | 0.072  | 0.120  | 0.116  | 0.137  | 0.221  | 3  | 2  |
| 5361   | A BOO     | K0 III     |  | 5.047   | 1.738  | 1.540  | 1.636  | 1.412  | 0.476  | 0.487  | 0.783  | 0.979  | 1.221  | 1.309  | 1.489  | 1.706  | 3  | 2  |
| 5370   | 20 BOO    | K3 III     |  | 5.163   | 2.368  | 2.155  | 2.202  | 1.729  | 0.511  | 0.616  | 0.947  | 1.210  | 1.483  | 1.601  | 1.822  | 1.999  | 3  | 2  |
| 5378   |           | B7 III P   |  | 4.480</ |        |        |        |        |        |        |        |        |        |        |        |        |    |    |

## H. L. JOHNSON AND R. I. MITCHELL

317

TABLE 7 (CONTINUED)

| B.S.    | NAME | SP. TYPE | 52        | 33-52 | 35-52  | 37-52  | 40-52  | 45-52  | 52-58  | 52-63  | 52-72  | 52-80  | 52-86  | 52-99  | 52-11C | NB     | NR    |
|---------|------|----------|-----------|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|-------|
| 5487    | MU   | VIR      | F3 IV     | 3.959 | 0.166  | 0.102  | 0.235  | 0.421  | 0.207  | 0.218  | 0.334  | 0.493  | 0.602  | 0.644  | 0.665  | 0.722  | 2 2   |
| 5490 V  | 34   | 800      | G M3      | 5.172 | 3.655  | 3.101  | 3.024  | 2.453  | 0.808  | 0.731  | 1.290  | 2.084  | 2.646  | 2.869  | 3.230  | 3.481  | 6 1   |
| 5502    | OMI  | 800      | K0 III    | 4.823 | 1.479  | 1.301  | 1.384  | 1.268  | 0.453  | 0.449  | 0.722  | 0.953  | 1.168  | 1.268  | 1.392  | 1.520  | 3 3   |
| 5505/6  | EPS  | 800      | K1: III+4 | 2.622 | 1.424  | 1.320  | 1.365  | 1.222  | 0.456  | 0.482  | 0.755  | 1.006  | 1.245  | 1.349  | 1.509  | 1.641  | 3 2   |
| 5511    | 109  | VIR      | A0 V      | 3.723 | -0.027 | -0.028 | -0.061 | -0.010 | 0.008  | 0.009  | 0.022  | 0.002  | 0.000  | -0.005 | -0.033 | 0.011  | 3 3   |
| 5528    | OMI  | LUP      | B5 IV     | 4.410 | -1.080 | -1.010 | -0.650 | -0.240 | -0.070 | -0.030 | -0.060 |        |        |        |        |        | 3 0   |
| 5531    | ALF  | 2 LIB    | A M       | 2.794 | 0.244  | 0.192  | 0.205  | 0.183  | 0.064  | 0.072  | 0.104  | 0.158  | 0.189  | 0.188  | 0.216  | 0.252  | 2 2   |
| 5543    |      |          | B6 V      | 5.050 | -1.160 | -1.090 | -0.690 | -0.240 | -0.040 | -0.050 | -0.090 |        |        |        |        |        | 3 0   |
| 5544 D  | XI   | 800      | G8 V      | 4.747 | 0.662  | 0.569  | 0.839  | 0.906  | 0.318  | 0.418  | 0.677  | 0.888  | 1.084  | 1.149  | 1.247  | 1.375  | 3 2   |
| 5551    | THE  | CRB      | B3 VNE    | 5.530 | -0.990 | -0.920 | -0.630 | -0.140 | 0.000  | -0.010 | 0.080  |        |        |        |        |        | 3 0   |
| 5563    | BET  | UMI      | K4 III    | 2.479 | 3.088  | 2.676  | 2.756  | 2.156  | 0.626  | 0.739  | 1.150  | 1.525  | 1.873  | 2.018  | 2.269  | 2.460  | 3 2   |
| 5570    | 16   | LIB      | F0 IV     | 4.550 | 0.237  | 0.173  | 0.232  | 0.348  | 0.160  | 0.168  | 0.285  | 0.367  | 0.453  | 0.463  | 0.491  | 0.575  | 3 2   |
| 5571    | BET  | LUP      | B2 III    | 2.713 | -1.453 | -1.363 | -0.905 | -0.345 | -0.074 | -0.074 | -0.122 | -0.171 | -0.233 | -0.285 | -0.445 | -0.459 | 4 1   |
| 5576    | KAP  | CEN      | B2 IV     | 3.160 | -1.343 | -1.244 | -0.813 | -0.289 | -0.078 | -0.072 | -0.121 | -0.164 | -0.229 | -0.277 | -0.426 | -0.451 | 4 1   |
| 5586 V  | DEL  | LIB      | A0        | 4.941 | -0.136 | -0.133 | -0.123 | -0.025 | 0.018  | 0.030  | 0.056  | 0.082  | 0.106  | 0.093  | 0.359  | 0.023  | 3 2   |
| 5589 V. | RR   | UMI      | M5 III    | 4.982 | 3.628  | 2.872  | 2.657  | 2.076  | 0.941  | 0.499  | 1.272  | 2.470  | 3.251  | 3.547  | 4.096  | 4.407  | 1 1   |
| 5595    |      |          | B3 V      | 5.480 | -1.040 | -0.920 | -0.590 | -0.190 | -0.030 | -0.050 | -0.070 |        |        |        |        |        | 3 0   |
| 5600    | DMG  | 800      | K4 III    | 5.221 | 3.183  | 2.806  | 2.829  | 2.224  | 0.629  | 0.785  | 1.210  | 1.663  | 2.027  | 2.175  | 2.438  | 2.663  | 2 2   |
| 5601    | 110  | VIR      | K0 III    | 4.589 | 1.699  | 1.463  | 1.571  | 1.387  | 0.492  | 0.489  | 0.790  | 1.038  | 1.302  | 1.442  | 1.583  | 1.738  | 2 2   |
| 5602    | BET  | 800      | G8 III    | 3.725 | 1.492  | 1.302  | 1.329  | 1.244  | 0.454  | 0.433  | 0.715  | 0.930  | 1.162  | 1.258  | 1.388  | 1.503  | 2 2   |
| 5603    | SIG  | LIB      | M4 III    | 3.681 | 3.775  | 3.185  | 3.022  | 2.390  | 0.798  | 0.730  | 1.310  | 2.177  | 2.744  | 2.998  | 3.399  | 3.670  | 1 1   |
| 5616    | PSI  | 800      | K2 III    | 4.821 | 2.415  | 2.113  | 2.176  | 1.773  | 0.559  | 0.615  | 0.977  | 1.223  | 1.509  | 1.640  | 1.850  | 2.079  | 2 2   |
| 5625    |      |          | B7:V+NN   | 6.060 | -0.820 | -0.740 | -0.490 | -0.200 | -0.050 | -0.030 | -0.040 |        |        |        |        |        | 3 0   |
| 5626    | LAM  | LUP      | B3 V      | 4.110 | -1.190 | -1.120 | -0.720 | -0.250 | -0.060 | -0.050 | -0.090 |        |        |        |        |        | 3 0   |
| 5634    | 45   | 800      | F5 V      | 5.012 | 0.158  | 0.105  | 0.282  | 0.497  | 0.227  | 0.223  | 0.388  | 0.525  | 0.642  | 0.682  | 0.708  | 0.733  | 2 2   |
| 5649    | ZET  | LUP      | G8 III    | 3.616 | 1.340  | 1.122  | 1.259  | 1.164  | 0.406  | 0.449  | 0.707  | 0.943  | 1.150  | 1.247  | 1.376  | 1.562  | 1 1   |
| 5651    |      |          | B3 IV     | 4.850 | -1.220 | -1.120 | -0.730 | -0.250 | -0.060 | -0.060 | -0.090 |        |        |        |        |        | 3 0   |
| 5652    | 10T  | LIB      | B9 IV(SI) | 4.564 | -0.590 | -0.556 | -0.387 | -0.126 | -0.027 | 0.008  | -0.007 | -0.024 | -0.048 | -0.056 | -0.110 | -0.130 | 2 3   |
| 5671    | GAM  | TRA      | A0 V      | 2.938 | 0.136  | 0.105  | -0.102 | -0.024 | 0.044  | 0.048  | 0.056  | 0.096  | 0.100  | 0.117  | 0.132  | 0.160  | 1 1   |
| 5681    | DEL  | 800      | G8 III    | 3.725 | 1.429  | 1.213  | 1.336  | 1.222  | 0.466  | 0.438  | 0.727  | 0.974  | 1.224  | 1.329  | 1.476  | 1.618  | 2 2   |
| 5685    | BET  | LIB      | B8 V      | 2.605 | -0.570 | -0.524 | -0.463 | -0.163 | -0.034 | -0.026 | -0.044 | -0.069 | -0.086 | -0.091 | -0.148 | -0.163 | 99 69 |
| 5695    | DEL  | LUP      | B1.5 IV   | 3.237 | -1.485 | -1.361 | -0.914 | -0.313 | -0.098 | -0.075 | -0.122 | -0.159 | -0.229 | -0.283 | -0.439 | -0.455 | 4 1   |
| 5705    | PHI  | 1 LUP    | K5 III    | 3.993 | 3.212  | 2.848  | 2.817  | 2.210  | 0.640  | 0.794  | 1.244  | 1.711  | 2.073  | 2.230  | 2.504  | 2.762  | 1 1   |
| 5708 D  | EPS  | LUP      | B2 IV-V   | 3.366 | -1.286 | -1.186 | -0.762 | -0.264 | -0.064 | -0.075 | -0.115 | -0.200 | -0.238 | -0.293 | -0.432 | -0.458 | 4 1   |
| 5712    | PHI  | 2 LUP    | B4 V      | 4.590 | -1.110 | -1.020 | -0.660 | -0.240 | -0.060 | -0.050 | -0.080 |        |        |        |        |        | 3 0   |
| 5733    | MU   | 800      | F3 IV     | 4.391 | 0.261  | 0.192  | 0.255  | 0.349  | 0.151  | 0.164  | 0.273  | 0.362  | 0.434  | 0.456  | 0.492  | 0.510  | 2 2   |
| 5735    | GAM  | UMI      | A3 II-III | 3.065 | 0.407  | 0.335  | -0.062 | 0.026  | 0.043  | 0.051  | 0.102  | 0.138  | 0.177  | 0.227  | 0.268  | 0.200  | 3 3   |
| 5736    |      |          | B5 V      | 5.470 | -0.960 | -0.880 | -0.550 | -0.220 | -0.040 | -0.030 | -0.070 |        |        |        |        |        | 3 0   |
| 5744    | 10T  | DRA      | K2 III    | 3.613 | 2.191  | 1.970  | 2.004  | 1.617  | 0.594  | 0.594  | 0.912  | 1.177  | 1.430  | 1.549  | 1.722  | 1.888  | 2 2   |
| 5747    | BET  | CRB      | F0 P      | 3.738 | 0.289  | 0.226  | 0.327  | 0.358  | 0.118  | 0.145  | 0.208  | 0.181  | 0.227  | 0.218  | 0.241  | 0.326  | 2 2   |
| 5763    | NU   | 1 800    | K5 III    | 5.480 | 3.399  | 2.876  | 2.912  | 2.350  | 0.717  | 0.796  | 1.250  | 1.747  | 2.156  | 2.327  | 2.633  | 2.864  | 1 1   |
| 5764    | ZET  | LIB      | B2 VNN    | 5.512 | -1.248 | -1.134 | -0.738 | -0.208 | -0.038 | -0.040 | -0.046 | -0.118 | -0.173 | -0.192 | -0.302 | -0.381 | 4 2   |
| 5774 D  | NU   | 2 800    | A2N       | 5.024 | 0.315  | 0.247  | 0.113  | 0.083  | 0.039  | 0.056  | 0.082  | 0.118  | 0.155  | 0.164  | 0.217  | 0.219  | 1 2   |
| 5776    | GAM  | LUP      | B2 IV     | 2.796 | -1.406 | -1.290 | -0.859 | -0.298 | -0.066 | -0.083 | -0.113 | -0.156 | -0.225 | -0.278 | -0.420 | -0.403 | 4 1   |
| 5777    | 37   | LIB      | K1 IV     | 4.864 | 1.617  | 1.414  | 1.561  | 1.331  | 0.447  | 0.494  | 0.790  | 1.004  | 1.216  | 1.321  | 1.485  | 1.720  | 2 2   |
| 5778    | THE  | CRB      | B7NN      | 4.144 | -0.887 | -0.826 | -0.552 | -0.182 | -0.027 | -0.041 | -0.066 | -0.135 | -0.169 | -0.205 | -0.248 | -0.227 | 2 2   |
| 5780    |      |          | B7 IV:    | 5.145 | -0.804 | -0.730 | -0.469 | -0.134 | -0.026 | -0.020 | -0.046 | -0.056 | -0.077 | -0.126 | -0.166 | -0.200 | 4 2   |
| 5781    |      |          | B3 IVP    | 4.566 | -1.201 | -1.101 | -0.701 | -0.245 | -0.058 | -0.066 | -0.109 | -0.193 | -0.241 | -0.290 | -0.421 | -0.450 | 4 1   |
| 5787    | GAM  | LIB      | G8 III-IV | 4.140 | 1.528  | 1.300  | 1.441  | 1.303  | 0.469  | 0.469  | 0.772  | 1.025  | 1.255  | 1.365  | 1.523  | 1.718  | 2 2   |
| 5788/9  | DEL  | SER      | F0 IV     | 3.840 | 0.302  | 0.246  | 0.250  | 0.286  | 0.111  | 0.135  | 0.211  | 0.244  | 0.296  | 0.323  | 0.358  | 0.449  | 2 2   |
| 5793 V  | ALF  | CRB      | A0 V      | 2.223 | -0.060 | -0.046 | -0.058 | -0.041 | -0.014 | 0.000  | -0.010 | -0.011 | -0.012 | -0.016 | -0.008 | -0.026 | 3 2   |
| 5794    | UPS  | LIB      | K5 III    | 3.923 | 2.752  | 2.403  | 2.472  | 1.931  | 0.578  | 0.703  | 1.072  | 1.428  | 1.741  | 1.884  | 2.125  | 2.353  | 1 1   |
| 5801    |      |          | B8 V      | 6.220 | -0.730 | -0.720 | -0.440 | -0.070 | 0.020  | 0.010  | 0.020  |        |        |        |        |        | 2 0   |
| 5812    | TAU  | LIB      | B2.5 V    | 3.620 | -1.200 | -1.114 | -0.710 | -0.241 | -0.050 | -0.075 | -0.133 | -0.153 | -0.201 | -0.236 | -0.362 | -0.412 | 4 1   |
| 5825    |      |          | F5 IV-V   | 4.733 | 0.122  | 0.089  | 0.239  | 0.433  | 0.198  | 0.202  | 0.342  |        |        |        |        |        | 1 0   |
| 5838    | KAP  | LIB      | K5 III    | 5.186 | 3.399  | 2.945  | 2.949  | 2.306  | 0.660  | 0.800  | 1.289  | 1.790  | 2.199  | 2.278  | 2.689  | 2.976  | 2 2   |
| 5839    | PSI  | 2 LUP    | B5 V      | 4.740 | -0.980 | -0.900 | -0.560 | -0.200 | -0.060 | -0.030 | -0.060 |        |        |        |        |        | 4 0   |
| 5842 D  | 10T  | SER      | A1 V      | 4.546 | 0.098  | 0.092  | 0.108  | 0.060  | 0.020  | 0.034  | 0.043  | 0.052  | 0.063  | 0.060  | 0.071  | 0.098  | 2 2   |
| 5849 D  | GAM  | CRB      | A0 IV     | 3.840 | -0.033 | -0.032 | -0.011 | -0.002 | 0.000  | 0.026  | 0.020  | -0.016 | -0.012 | -0.033 | -0.022 | -0.017 | 2 2   |
| 5854    | ALF  | SER      | K2 III    | 2.930 | 2.210  | 2.013  | 2.054  | 1.639  | 0.501  | 0.572  | 0.879  | 1.142  | 1.392  | 1.510  | 1.691  | 1.873  | 99 66 |
| 5859    |      |          | A0 V      | 5.580 | 0.092  | 0.057  | 0.038  | 0.017  | 0.014  | 0.018  | 0.042  | 0.006  | 0.017  | 0.025  | 0.043  | 0.014  | 2 2   |
| 5867    | BET  | SER      | A2 IV     | 3.696 | 0.192  | 0.171  | 0.101  | 0.084  | 0.024  | 0.044  | 0.065  | 0.031  | 0.059  | 0.067  | 0.104  | 0.124  | 3 2   |
| 5868    | LAM  |          | G0 V      | 4.551 | 0.423  | 0.322  | 0.536  | 0.686  | 0.292  | 0.299  | 0.506  | 0.619  | 0.783  | 0.831  | 0.900  | 1.009  | 3 3   |
| 5869    |      |          | B8 V      | 5.920 | -0.440 | -0.360 | -0.220 | -0.110 | -0.020 | 0.030  | 0.070  |        |        |        |        |        | 2 0   |
| 5879    | KAP  | SER      | M1 III    | 4.521 | 3.535  | 3.017  | 3.014  | 2.389  | 0.702  | 0.801  | 1.289  | 1.851  | 2.296  | 2.493  | 2.817  | 3.055  | 4 2   |
| 5881    | MU   | SER      | A0 V      | 3.561 | -0.185 | -0.164 | -0.132 | -0.056 | -0.007 | -0.001 | 0.007  | -0.035 | -0.032 | -0.035 | -0.058 | -0.081 | 2 2   |
| 5883    | CHI  | LUP      | A0 III-IV | 4.010 | -0.250 | -0.200 | -0.150 | -0.070 | -0.020 | -0.020 | -0.030 |        |        |        |        |        | 3 0   |
| 5885    | 1    | SCD      | B1.5 VN   | 4.640 | -1.090 | -1.000 | -0.540 | -0.100 | -0.010 | 0.010  | 0.000  |        |        |        |        |        | 2 0   |
| 5889    | DEL  | CRB      | G5 III-IV | 4.820 | 0.900  | 0.724  | 0.889  | 0.965  | 0.380  | 0.390  | 0.627  | 0.807  | 1.005  | 1.073  | 1.182  | 1.313  | 2 2   |
| 5892    | EPS  | SER      | AM        | 3.760 | 0.202  | 0.154  | 0.216  | 0.195  | 0.042  | 0.081  | 0.123  | 0.100  | 0.135  | 0.135  | 0.164  | 0.186  | 2 2   |
| 5897    | BET  | TRA      | F2 IV     | 2.889 | 0.220  | 0.154  | 0.219  | 0.317  | 0.143  | 0.147  | 0.238  | 0.366  | 0.451  | 0.476  | 0.490  | 0.638  | 1 1   |
| 5899    | RHO  | SER      | K5 III    | 5.167 | 3.310  | 2.875  | 2.916  | 2.268  | 0.644  | 0.790  | 1.224  | 1.689  | 2.075  | 2.245  | 2.534  | 2.739  | 2 2   |
| 5901    | KAP  | CRB      | K0 III-   |       |        |        |        |        |        |        |        |        |        |        |        |        |       |

## THIRTEEN-COLOR PHOTOMETRY OF 1380 BRIGHT STARS

TABLE 7 (CONTINUED)

| B.S.    | NAME  | SP. TYPE | 52        | 33-52 | 35-52  | 37-52  | 40-52  | 45-52  | 52-58  | 52-63  | 52-72  | 52-80  | 52-86  | 52-99  | 52-110 | NB     | NR    |
|---------|-------|----------|-----------|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|-------|
| 5948    | ETA   | LUP      | B2.5 IV   | 3.409 | -1.439 | -1.312 | -0.854 | -0.294 | -0.067 | -0.076 | -0.119 | -0.230 | -0.280 | -0.327 | -0.494 | -0.473 | 3 1   |
| 5953    | DEL   | SCD      | B0.5 IV   | 2.306 | -1.446 | -1.336 | -0.828 | -0.197 | -0.010 | -0.030 | -0.044 | -0.027 | -0.064 | -0.097 | -0.218 | -0.232 | 3 2   |
| 5960    |       |          | F0 IV     | 5.048 | 0.230  | 0.181  | 0.233  | 0.309  | 0.132  | 0.138  | 0.221  | 0.331  | 0.399  | 0.425  | 0.442  | 0.449  | 2 3   |
| 5967    |       |          | B6 IV     | 4.950 | -1.020 | -0.900 | -0.580 | -0.190 | -0.040 | -0.020 | -0.040 |        |        |        |        |        | 2 0   |
| 5971    | IDT   | CRB      | A0 II-III | 4.975 | -0.334 | -0.290 | -0.247 | -0.091 | -0.014 | -0.008 | -0.028 | -0.038 | -0.029 | -0.044 | -0.077 | -0.136 | 2 2   |
| 5972    | PI    | SER      | A3 V      | 4.847 | 0.131  | 0.114  | 0.134  | 0.088  | 0.027  | 0.039  | 0.053  | 0.049  | 0.072  | 0.061  | 0.083  | 0.068  | 2 3   |
| 5977/8  | XI    | SCD      | F5 IV     | 4.227 | 0.294  | 0.231  | 0.329  | 0.525  | 0.237  | 0.230  | 0.358  | 0.508  | 0.638  | 0.659  | 0.607  | 0.608  | 2 2   |
| 5982    | UPS   | HER      | B9P       | 4.713 | -0.537 | -0.508 | -0.397 | -0.152 | -0.024 | -0.017 | -0.039 | -0.084 | -0.098 | -0.114 | -0.165 | -0.201 | 2 3   |
| 5984/5  | BET   | SCD      | B0.5 V    | 2.523 | -1.303 | -1.198 | -0.750 | -0.143 | 0.018  | -0.021 | -0.011 | -0.064 | -0.070 | -0.107 | -0.197 | -0.201 | 2 2   |
| 5986    | THE   | DRA      | F8 IV-V   | 4.131 | 0.398  | 0.303  | 0.439  | 0.604  | 0.260  | 0.262  | 0.436  | 0.566  | 0.713  | 0.755  | 0.809  | 0.857  | 2 2   |
| 5987    | THE   | LUP      | B2.5 VN   | 4.300 | -1.210 | -1.090 | -0.740 | -0.260 | -0.060 | -0.040 | -0.070 |        |        |        |        |        | 2 0   |
| 5988    |       |          | B9 I III  | 5.880 | -0.940 | -0.850 | -0.530 | -0.140 | -0.020 | -0.020 | -0.020 |        |        |        |        |        | 2 0   |
| 5993    | DMG 1 | SCD      | B1 V      | 3.960 | -1.248 | -1.160 | -0.695 | -0.107 | 0.034  | 0.000  | 0.010  | -0.005 | -0.007 | -0.031 | -0.107 | -0.670 | 3 2   |
| 5997    | DMG 2 | SCD      | G2        | 4.496 | 1.184  | 0.970  | 1.050  | 1.055  | 0.413  | 0.389  | 0.637  | 0.820  | 1.027  | 1.098  | 1.223  | 1.377  | 2 2   |
| 5998    |       |          | B7 IV     | 6.290 | -0.800 | -0.720 | -0.450 | -0.090 | 0.010  | -0.020 | -0.030 |        |        |        |        |        | 1 0   |
| 6003    |       |          | B9 V      | 5.850 | -0.490 | -0.440 | -0.230 | 0.000  | 0.040  | 0.000  | 0.020  |        |        |        |        |        | 2 0   |
| 6018    | TAU   | CRB      | K0 III    | 4.972 | 1.619  | 1.443  | 1.545  | 1.334  | 0.443  | 0.499  | 0.803  | 1.031  | 1.257  | 1.345  | 1.510  | 1.691  | 2 3   |
| 6023    | PHI   | HER      | B9P       | 4.249 | -0.417 | -0.392 | -0.284 | -0.097 | -0.018 | -0.011 | -0.012 | -0.023 | -0.026 | -0.041 | -0.065 | -0.135 | 2 2   |
| 6027 D  | NU    | SCD      | B2 V      | 4.010 | -0.979 | -0.916 | -0.528 | -0.021 | -0.059 | 0.057  | 0.101  | 0.135  | 0.171  | 0.179  | 0.175  | 0.210  | 3 3   |
| 6028    | 13    | SCD      | B2 V      | 4.530 | -1.230 | -1.120 | -0.720 | -0.210 | -0.030 | -0.080 | -0.100 |        |        |        |        |        | 2 0   |
| 6030    | DEL   | TRA      | G2 II     | 4.066 | 1.825  | 1.577  | 1.619  | 1.502  | 0.530  | 0.486  | 0.788  | 1.042  | 1.265  | 1.396  | 1.559  | 1.733  | 1 1   |
| 6031    | PSI   | SCD      | A2 V      | 4.958 | 0.170  | 0.150  | 0.157  | 0.095  | 0.030  | 0.061  | 0.080  | 0.137  | 0.142  | 0.153  | 0.152  | 0.262  | 2 2   |
| 6042    |       |          | B7 IV     | 6.410 | -0.690 | -0.620 | -0.350 | 0.000  | 0.040  | 0.040  | 0.100  |        |        |        |        |        | 2 0   |
| 6054    |       |          | B8 IV     | 6.070 | -0.570 | -0.510 | -0.290 | 0.010  | 0.050  | 0.040  | 0.080  |        |        |        |        |        | 2 0   |
| 6056    | DEL   | OPH      | M0.5 III  | 3.142 | 3.499  | 2.992  | 2.993  | 2.353  | 0.693  | 0.782  | 1.243  | 1.868  | 2.313  | 2.515  | 2.823  | 3.055  | 2 2   |
| 6066    |       |          | B9.5 I V  | 6.610 | -0.260 | -0.240 | -0.120 | -0.010 | 0.030  | 0.030  | 0.050  |        |        |        |        |        | 1 0   |
| 6075    | EPS   | OPH      | G9 III    | 3.463 | 1.494  | 1.289  | 1.384  | 1.258  | 0.455  | 0.456  | 0.739  | 0.992  | 1.221  | 1.329  | 1.474  | 1.641  | 2 2   |
| 6081    | OMI   | SCD      | A5 II     | 4.750 | 1.950  | 1.710  | 0.990  | 0.850  | 0.460  | 0.460  | 0.830  |        |        |        |        |        | 2 0   |
| 6083    |       |          | B6 IV     | 5.420 | -0.680 | -0.590 | -0.410 | -0.100 | 0.010  | 0.010  | 0.030  |        |        |        |        |        | 2 0   |
| 6084 V  | SIG   | SCD      | B1 III    | 2.928 | -0.987 | -0.916 | -0.468 | 0.086  | 0.116  | 0.104  | 0.210  | 0.295  | 0.365  | 0.388  | 0.385  | 0.439  | 1 1   |
| 6092    | TAU   | HER      | B5 IV     | 3.895 | -0.973 | -0.890 | -0.597 | -0.209 | -0.053 | -0.047 | -0.073 | -0.135 | -0.162 | -0.203 | -0.286 | -0.322 | 31 35 |
| 6093    | SIG   | SER      | F0 V      | 4.909 | 0.216  | 0.192  | 0.255  | 0.376  | 0.169  | 0.192  | 0.313  | 0.419  | 0.507  | 0.535  | 0.567  | 0.632  | 2 2   |
| 6095    | GAM   | HER      | A9 III    | 3.835 | 0.472  | 0.404  | 0.320  | 0.301  | 0.118  | 0.161  | 0.250  | 0.373  | 0.453  | 0.477  | 0.551  | 0.575  | 2 3   |
| 6102    | GAM   | APS      | K0 IV     | 4.095 | 1.348  | 1.130  | 1.256  | 1.144  | 0.393  | 0.450  | 0.714  | 0.960  | 1.162  | 1.253  | 1.386  | 1.539  | 1 1   |
| 6103    | XI    | CRB      | K0 III    | 5.085 | 1.576  | 1.405  | 1.459  | 1.279  | 0.436  | 0.468  | 0.734  | 0.977  | 1.188  | 1.281  | 1.427  | 1.573  | 2 3   |
| 6104    | PSI   | OPH      | K0 III    | 4.729 | 1.591  | 1.409  | 1.526  | 1.335  | 0.465  | 0.485  | 0.771  | 0.929  | 1.146  | 1.252  | 1.404  | 1.644  | 2 1   |
| 6117    | DMG   | HER      | A1P       | 4.626 | -0.027 | -0.046 | -0.049 | -0.033 | -0.021 | 0.039  | 0.059  | 0.033  | 0.083  | 0.121  | 0.046  | -0.038 | 2 2   |
| 6118 V  | CHI   | OPH      | B2 VE     | 4.588 | -0.951 | -0.961 | -0.429 | 0.161  | 0.193  | 0.150  | 0.370  | 0.422  | 0.586  | 0.560  | 0.542  | 0.622  | 4 1   |
| 6129    | UPS   | OPH      | A8        | 4.672 | 0.189  | 0.148  | 0.218  | 0.211  | 0.076  | 0.101  | 0.141  | 0.207  | 0.255  | 0.259  | 0.277  | 0.341  | 2 2   |
| 6132    | ETA   | DRA      | G8 III    | 2.948 | 1.385  | 1.165  | 1.265  | 1.170  | 0.430  | 0.424  | 0.705  | 0.855  | 1.085  | 1.198  | 1.350  | 1.436  | 3 2   |
| 6134 V  | ALF   | SCD      | M1-M2 IAB | 1.461 | 2.529  | 2.456  | 2.543  | 2.407  | 0.933  | 0.894  | 1.468  | 2.259  | 2.808  | 3.059  | 3.535  | 3.852  | 1 3   |
| 6141    | 22    | SCD      | B2 V      | 4.770 | -1.200 | -1.080 | -0.690 | -0.190 | -0.020 | -0.030 | -0.050 |        |        |        |        |        | 2 0   |
| 6143    |       |          | B2 III    | 4.330 | -1.340 | -1.230 | -0.800 | -0.240 | -0.060 | -0.030 | -0.050 |        |        |        |        |        | 2 0   |
| 6146 V. | G     | HER      | M6-III    | 5.304 | 3.787  | 2.702  | 2.179  | 1.570  | 1.185  | 0.477  | 1.536  | 3.125  | 4.098  | 4.487  | 5.381  | 5.726  | 1 1   |
| 6147    | PHI   | OPH      | G8 III    | 4.466 | 1.420  | 1.257  | 1.321  | 1.207  | 0.435  | 0.418  | 0.682  | 0.831  | 1.025  | 1.117  | 1.244  | 1.450  | 2 2   |
| 6148    | BET   | HER      | G8 III    | 2.996 | 1.388  | 1.217  | 1.303  | 1.212  | 0.449  | 0.417  | 0.684  | 0.882  | 1.089  | 1.190  | 1.340  | 1.467  | 2 2   |
| 6149 D  | LAM   | OPH      | A1 V      | 3.821 | 0.030  | 0.021  | 0.040  | 0.029  | 0.011  | 0.027  | 0.041  | 0.052  | 0.060  | 0.051  | 0.072  | 0.062  | 2 2   |
| 6159    | 29    | HER      | K4 III    | 5.252 | 3.216  | 2.761  | 2.809  | 2.175  | 0.612  | 0.778  | 1.214  | 1.640  | 2.011  | 2.180  | 2.459  | 2.708  | 3 2   |
| 6161    | 15    | DRA      | B9 IV     | 4.964 | -0.147 | -0.133 | -0.199 | -0.090 | -0.023 | -0.003 | -0.015 | -0.059 | -0.049 | -0.054 | -0.040 | -0.135 | 3 2   |
| 6165    | TAU   | SCD      | B0 V      | 2.792 | -1.630 | -1.524 | -0.962 | -0.333 | -0.032 | -0.064 | -0.133 | -0.236 | -0.302 | -0.344 | -0.498 | -0.501 | 3 2   |
| 6168    | SIG   | HER      | B9 V      | 4.225 | -0.061 | -0.068 | -0.158 | -0.045 | 0.010  | 0.008  | 0.014  | 0.000  | 0.003  | 0.007  | 0.005  | -0.067 | 2 2   |
| 6174    |       |          | B3 IV     | 5.900 | -0.950 | -0.850 | -0.520 | -0.090 | 0.010  | 0.030  | 0.050  |        |        |        |        |        | 2 0   |
| 6175    | ZET   | OPH      | O9.5 V    | 2.587 | -1.247 | -1.177 | -0.698 | -0.060 | 0.083  | 0.029  | 0.080  | 0.060  | 0.087  | 0.061  | -0.020 | -0.026 | 4 2   |
| 6212 D  | ZET   | HER      | G0 IV     | 2.941 | 0.549  | 0.449  | 0.630  | 0.761  | 0.287  | 0.343  | 0.545  | 0.703  | 0.862  | 0.924  | 1.000  | 1.090  | 4 3   |
| 6217    | ALF   | TRA      | K4 III    | 2.287 | 2.864  | 2.546  | 2.543  | 2.093  | 0.648  | 0.698  | 1.058  | 1.416  | 1.713  | 1.857  | 2.098  | 2.353  | 1 2   |
| 6220    | ETA   | HER      | G7 III-IV | 3.725 | 1.268  | 1.096  | 1.222  | 1.151  | 0.426  | 0.418  | 0.702  | 0.907  | 1.116  | 1.210  | 1.351  | 1.482  | 2 2   |
| 6229    | ETA   | ARA      | K5 III    | 4.199 | 3.393  | 2.953  | 2.920  | 2.296  | 0.644  | 0.828  | 1.247  | 1.811  | 2.203  | 2.364  | 2.650  | 2.873  | 1 1   |
| 6237    |       |          | F2 V      | 4.997 | 0.162  | 0.099  | 0.222  | 0.407  | 0.202  | 0.196  | 0.338  | 0.440  | 0.548  | 0.585  | 0.623  | 0.609  | 2 2   |
| 6241    | EPS   | SCD      | K2 III-IV | 2.582 | 2.146  | 1.846  | 1.991  | 1.545  | 0.513  | 0.576  | 0.862  | 1.083  | 1.346  | 1.465  | 1.666  | 1.885  | 1 2   |
| 6243    | 20    | OPH      | F5 IV-V   | 4.781 | 0.371  | 0.276  | 0.377  | 0.592  | 0.234  | 0.243  | 0.410  | 0.544  | 0.657  | 0.694  | 0.761  | 0.881  | 2 2   |
| 6245    |       |          | O8F       | 5.345 | -1.240 | -1.175 | -0.652 | 0.006  | 0.045  | 0.124  | 0.206  | 0.279  | 0.320  | 0.329  | 0.294  | 0.360  | 1 1   |
| 6247 V  | MU 1  | SCD      | B1.5 IV   | 3.006 | -1.438 | -1.323 | -0.836 | -0.295 | -0.090 | -0.030 | -0.065 | -0.090 | -0.159 | -0.207 | -0.338 | -0.338 | 1 1   |
| 6252    | MU 2  | SCD      | B2 IV     | 3.564 | -1.424 | -1.283 | -0.800 | -0.260 | -0.065 | -0.040 | -0.066 | -0.150 | -0.214 | -0.290 | -0.415 | -0.510 | 3 1   |
| 6254    | 52    | HER      | A2P       | 4.875 | 0.094  | 0.064  | 0.121  | 0.103  | 0.015  | 0.062  | 0.093  | 0.065  | 0.085  | 0.081  | 0.083  | 0.088  | 2 3   |
| 6271    | ZET   | SCD      | K5 III    | 4.025 | 2.832  | 2.546  | 2.572  | 2.004  | 0.549  | 0.747  | 1.102  | 1.508  | 1.812  | 1.948  | 2.177  | 2.420  | 1 1   |
| 6281    | IDT   | OPH      | B8 IV     | 4.374 | -0.584 | -0.512 | -0.368 | -0.149 | -0.027 | -0.025 | -0.045 | -0.067 | -0.094 | -0.115 | -0.145 | -0.228 | 2 2   |
| 6285    | ZET   | ARA      | K5 III    | 3.557 | 3.389  | 3.019  | 2.960  | 2.398  | 0.707  | 0.825  | 1.253  | 1.698  | 2.061  | 2.223  | 2.549  | 2.785  | 1 1   |
| 6299    | KAP   | OPH      | K2 III    | 3.494 | 2.101  | 1.913  | 1.970  | 1.588  | 0.496  | 0.564  | 0.882  | 1.167  | 1.400  | 1.520  | 1.688  | 1.842  | 6 1   |
| 6315    | 19    | DRA      | F6 V      | 5.015 | 0.176  | 0.099  | 0.317  | 0.549  | 0.255  | 0.257  | 0.433  | 0.462  | 0.697  | 0.708  | 0.796  | 0.844  | 2 1   |
| 6320    |       |          | B5 V      | 5.780 | -0.930 | -0.790 | -0.500 | -0.150 | -0.030 | 0.040  | 0.050  |        |        |        |        |        | 1 0   |
| 6322 V  | EPS   | UNI      | G5 III    | 4.413 | 1.219  | 1.029  | 1.133  | 1.135  | 0.440  | 0.414  | 0.686  | 0.902  | 1.110  | 1.201  | 1.325  | 1.441  | 2 2   |
| 6324    | UPS   | HER      | B9.5 V    | 3.938 | -0.210 | -0.181 | -0.111 | -0.044 | -0.012 | 0.014  | 0.016  | 0.010  | 0.007  | -0.009 | -0.021 | -0.025 | 2 3   |
| 6337    |       |          | M3 III    | 5.398 | 3.589  |        |        |        |        |        |        |        |        |        |        |        |       |

## H. L. JOHNSON AND R. I. MITCHELL

319

TABLE 7 (CONTINUED)

| B.S. | NAME  | SP. TYPE | 52        | 33-52       | 35-52  | 37-52  | 40-52  | 45-52  | 52-58  | 52-63  | 52-72  | 52-80  | 52-86  | 52-99  | 52-110 | NR     |        |    |   |
|------|-------|----------|-----------|-------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|----|---|
| 6498 | SIG   | OPH      | K3 II     | 4.724       | 2.980  | 2.660  | 2.646  | 2.168  | 0.708  | 0.725  | 1.137  | 1.495  | 1.812  | 1.985  | 2.253  | 2.477  | 2      | 2  |   |
| 6500 | DEL   | ARA      | B7 WN     | 3.844       | -0.760 | -0.746 | -0.634 | -0.386 | -0.273 | 0.217  | 0.199  | 0.167  | 0.147  | 0.145  | 0.085  | 0.093  | 1      | 1  |   |
| 6508 | UPS   | SCD      | B2 IV     | 2.674       | -1.372 | -1.296 | -0.806 | -0.312 | -0.060 | -0.062 | -0.123 | -0.214 | -0.264 | -0.318 | -0.461 | -0.536 | 7      | 2  |   |
| 6510 | ALF   | ARA      | B2 WN E   | 2.858       | -1.305 | -1.256 | -0.736 | -0.213 | -0.047 | 0.002  | 0.084  | 0.095  | 0.145  | 0.053  | -0.097 | 0.007  | 1      | 1  |   |
| 6526 | LAM   | HER      | K4 III    | 4.797       | 2.965  | 2.606  | 2.659  | 2.093  | 0.617  | 0.712  | 1.110  | 1.455  | 1.758  | 1.908  | 2.157  | 2.377  | 2      | 2  |   |
| 6527 | LAM   | SCD      | B1.5 IV   | X           | 1.599  | -1.405 | -1.346 | -0.848 | -0.320 | -0.047 | -0.078 | -0.134 | -0.235 | -0.289 | -0.350 | -0.491 | -0.497 | 2  | 2 |
| 6536 | BET   | DRA      | G2 II     | 3.029       | 1.403  | 1.186  | 1.220  | 1.228  | 0.474  | 0.455  | 0.734  | 0.931  | 1.170  | 1.241  | 1.386  | 1.521  | 2      | 3  |   |
| 6553 | THE   | SCD      | F0 I8     | 1.961       | 0.721  | 0.562  | 0.335  | 0.415  | 0.164  | 0.262  | 0.401  | 0.483  | 0.586  | 0.654  | 0.719  | 0.817  | 1      | 1  |   |
| 6554 | NU 1  | DRA      | AM        | 4.965       | 0.199  | 0.155  | 0.223  | 0.288  | 0.126  | 0.124  | 0.219  | 0.286  | 0.350  | 0.379  | 0.413  | 0.389  | 2      | 2  |   |
| 6555 | NU 2  | DRA      | AM        | 4.946       | 0.263  | 0.218  | 0.286  | 0.353  | 0.140  | 0.139  | 0.234  | 0.300  | 0.371  | 0.396  | 0.415  | 0.447  | 2      | 2  |   |
| 6556 | ALF   | OPH      | A5 III    | 2.129       | 0.278  | 0.225  | 0.203  | 0.188  | 0.071  | 0.081  | 0.130  | 0.163  | 0.209  | 0.264  | 0.276  | 2      | 3      |    |   |
| 6561 | XI    | SER      | F0 IV     | 3.605       | 0.338  | 0.273  | 0.262  | 0.310  | 0.114  | 0.153  | 0.220  | 0.335  | 0.397  | 0.414  | 0.446  | 0.475  | 2      | 2  |   |
| 6567 | MU    | OPH      | B8 V      | 4.656       | -0.179 | -0.171 | -0.172 | 0.082  | 0.098  | 0.087  | 0.162  | 0.188  | 0.246  | 0.286  | 0.341  | 0.395  | 2      | 2  |   |
| 6580 | KAP   | SCD      | B1.5 III  | X           | 2.385  | -1.422 | -1.359 | -0.877 | -0.323 | -0.060 | -0.063 | -0.134 | -0.250 | -0.291 | -0.341 | -0.482 | -0.482 | 2  | 2 |
| 6581 | OMI   | SER      | A2 V      | 4.266       | 0.203  | 0.187  | 0.149  | 0.094  | 0.044  | 0.038  | 0.064  | 0.104  | 0.115  | 0.108  | 0.125  | 0.159  | 2      | 2  |   |
| 6582 | ETA   | PAV      | K1 III    | 3.864       | 2.190  | 1.917  | 1.989  | 1.666  | 0.546  | 0.561  | 0.875  | 1.148  | 1.388  | 1.518  | 1.703  | 1.871  | 1      | 1  |   |
| 6588 | DOT   | HER      | B3 V      | 3.792       | -1.173 | -1.066 | -0.723 | -0.247 | -0.055 | -0.065 | -0.092 | -0.156 | -0.189 | -0.225 | -0.328 | -0.392 | 2      | 3  |   |
| 6596 | OMG   | DRA      | F2 V      | 4.890       | 0.187  | 0.126  | 0.301  | 0.493  | 0.229  | 0.227  | 0.378  | 0.538  | 0.649  | 0.668  | 0.719  | 0.761  | 2      | 3  |   |
| 6603 | BET   | OPH      | K2 III    | 3.061       | 2.192  | 1.999  | 2.045  | 1.632  | 0.500  | 0.573  | 0.896  | 1.148  | 1.397  | 1.512  | 1.693  | 1.871  | 90     | 54 |   |
| 6615 | DOT 1 | SCD      | F2 IA     | X           | 3.135  | 1.450  | 1.064  | 0.542  | 0.540  | 0.307  | 0.263  | 0.416  | 0.568  | 0.694  | 0.877  | 0.986  | 1.101  | 2  | 2 |
| 6621 |       |          | B3 IV     | 6.330       | -0.610 | -0.540 | -0.320 | 0.070  | 0.110  | 0.11C  | C.200  |        |        |        |        |        |        | 3  | 0 |
| 6623 | MU    | HER      | G5 IV     | 3.611       | 0.819  | 0.726  | 0.898  | 0.902  | 0.329  | 0.362  | 0.590  | 0.759  | 0.947  | 0.997  | 1.089  | 1.195  | 2      | 2  |   |
| 6629 | GAM   | OPH      | A0 V      | 3.751       | 0.062  | 0.055  | 0.072  | 0.046  | 0.013  | 0.007  | 0.016  | 0.034  | 0.041  | 0.035  | 0.053  | 0.045  | 74     | 48 |   |
| 6630 |       |          | K1 III    | 3.494       | 2.179  | 1.885  | 2.011  | 1.626  | 0.502  | 0.610  | 0.938  | 1.233  | 1.475  | 1.616  | 1.807  | 2.010  | 1      | 1  |   |
| 6636 | PSI   | DRA      | F5 IV-V   | 4.693       | 0.205  | 0.147  | 0.283  | 0.467  | 0.208  | 0.242  | 0.390  | 0.483  | 0.570  | 0.645  | 0.751  | 0.803  | 2      | 2  |   |
| 6685 | 89    | HER      | F2 IA     | 5.545       | 1.089  | 0.801  | 0.267  | 0.387  | 0.215  | 0.176  | 0.321  | 0.393  | 0.491  | 0.607  | 0.583  | 0.583  | 2      | 2  |   |
| 6688 | XI    | DRA      | K2 III    | 4.045       | 2.175  | 1.962  | 2.025  | 1.614  | 0.499  | 0.585  | 0.914  | 1.180  | 1.464  | 1.568  | 1.772  | 1.951  | 2      | 2  |   |
| 6695 | THE   | HER      | K1 II     | 4.180       | 2.352  | 2.369  | 2.355  | 1.949  | 0.636  | 0.617  | 0.958  | 1.219  | 1.486  | 1.620  | 1.834  | 2.015  | 2      | 2  |   |
| 6698 | NU    | OPH      | G9 III    | 3.553       | 1.689  | 1.507  | 1.558  | 1.340  | 0.457  | 0.457  | 0.745  | 0.951  | 1.163  | 1.251  | 1.403  | 1.571  | 2      | 2  |   |
| 6703 | XI    | HER      | G9 III    | 3.944       | 1.410  | 1.246  | 1.325  | 1.209  | 0.431  | 0.445  | 0.724  | 0.952  | 1.165  | 1.256  | 1.383  | 1.509  | 2      | 2  |   |
| 6705 | GAM   | DRA      | K5 III    | 2.662       | 3.275  | 2.838  | 2.885  | 2.255  | 0.639  | 0.778  | 1.218  | 1.675  | 2.057  | 2.221  | 2.506  | 2.725  | 2      | 3  |   |
| 6707 | *     | HER      | F2 II     | 4.519       | 0.548  | 0.447  | 0.288  | 0.395  | 0.190  | 0.206  | 0.368  | 0.504  | 0.632  | 0.681  | 0.750  | 0.826  | 2      | 2  |   |
| 6710 | ZET   | SER      | F3 V      | 4.719       | 0.209  | 0.122  | 0.253  | 0.426  | 0.195  | 0.208  | 0.353  | 0.449  | 0.546  | 0.558  | 0.593  | 0.673  | 2      | 1  |   |
| 6712 | 66    | OPH      | B2 VE     | 4.597       | -1.224 | -1.154 | -0.672 | -0.102 | 0.021  | 0.034  | 0.128  | 0.146  | 0.217  | 0.138  | 0.041  | 0.100  | 2      | 2  |   |
| 6713 | 93    | HER      | K0 II-III | 4.950       | 2.306  | 2.059  | 2.072  | 1.738  | 0.591  | 0.570  | 0.902  | 1.198  | 1.461  | 1.587  | 1.783  | 1.967  | 2      | 2  |   |
| 6714 | 67    | OPH      | B5 IB     | 4.000       | -0.861 | -0.814 | -0.564 | -0.042 | 0.073  | 0.051  | 0.094  | 0.086  | 0.097  | 0.112  | 0.057  | 0.094  | 2      | 2  |   |
| 6723 | 68    | OPH      | A1 V      | 4.479       | 0.048  | 0.045  | -0.015 | 0.014  | 0.022  | 0.048  | 0.070  | 0.080  | 0.078  | 0.091  | 0.115  | 0.146  | 2      | 2  |   |
| 6743 | THE   | ARA      | B2 IB     | X           | 3.668  | -1.283 | -1.243 | -0.757 | -0.212 | 0.021  | 0.012  | -0.017 | -0.010 | -0.023 | -0.072 | -0.211 | -0.141 | 2  | 2 |
| 6746 | GAM   | SGR      | K0 III    | X           | 3.228  | 1.150  | 3.566  | 1.599  | 1.346  | 0.500  | 0.488  | 0.818  | 0.998  | 1.215  | 1.311  | 1.473  | 1.627  | 1  | 2 |
| 6752 | D     | 70       | OPH       | K0 V        | 4.266  | 0.988  | 0.897  | 1.142  | 1.069  | 0.349  | 0.478  | 0.753  | 1.001  | 1.216  | 1.301  | 1.428  | 1.593  | 3  | 2 |
| 6770 |       |          | G8 III-IV | 4.862       | 1.501  | 1.332  | 1.409  | 1.269  | 0.469  | 0.433  | 0.703  | 0.906  | 1.114  | 1.212  | 1.339  | 1.516  | 2      | 2  |   |
| 6771 | 72    | OPH      | A4 V      | 3.782       | 0.187  | 0.157  | 0.182  | 0.149  | 0.041  | 0.076  | 0.120  | 0.161  | 0.194  | 0.225  | 0.195  | 0.23   | 3      | 1  |   |
| 6779 | OMI   | HER      | B9.5 III  | 3.821       | -0.010 | 0.011  | -0.150 | -0.046 | 0.009  | -0.014 | -0.006 | 0.009  | 0.021  | 0.029  | 0.042  | 0.040  | 2      | 4  |   |
| 6787 | 102   | HER      | B2 V      | 4.353       | -1.315 | -1.194 | -0.809 | -0.246 | -0.039 | -0.061 | -0.093 | -0.103 | -0.150 | -0.228 | -0.301 | -0.384 | 2      | 1  |   |
| 6789 | DEL   | UMI      | A1 V      | 4.393       | 0.089  | 0.074  | 0.036  | 0.011  | 0.008  | 0.025  | 0.016  | 0.066  | 0.082  | 0.078  | 0.077  | 0.005  | 2      | 2  |   |
| 6812 | MU    | SGR      | B8 IA     | X           | 3.936  | -0.487 | -0.527 | 0.182  | 0.182  | 0.172  | 0.147  | 0.275  | 0.371  | 0.460  | 0.538  | 0.562  | 0.664  | 1  | 1 |
| 6832 | ETA   | SGR      | M3 II     | X           | 3.450  | 3.534  | 2.846  | 2.805  | 2.236  | 0.780  | 0.652  | 1.247  | 2.043  | 2.614  | 2.868  | 3.266  | 3.601  | 2  | 2 |
| 6859 | DEL   | SGR      | K2 III    | X           | 3.052  | 2.854  | 2.441  | 2.557  | 1.995  | 0.653  | 0.669  | 0.997  | 1.328  | 1.606  | 1.767  | 2.009  | 2.242  | 2  | 2 |
| 6866 | 74    | OPH      | G8 III    | 5.055       | 1.327  | 1.121  | 1.234  | 1.180  | 0.436  | 0.406  | 0.669  | 0.876  | 1.094  | 1.160  | 1.309  | 1.475  | 2      | 2  |   |
| 6868 | 106   | HER      | M0 III    | 5.357       | 3.534  | 3.049  | 3.019  | 2.393  | 0.692  | 0.806  | 1.291  | 1.885  | 2.336  | 2.527  | 2.857  | 3.087  | 2      | 2  |   |
| 6869 | ETA   | SER      | K0 III-IV | 3.470       | 1.322  | 1.120  | 1.286  | 1.199  | 0.423  | 0.464  | 0.752  | 1.005  | 1.231  | 1.314  | 1.475  | 1.623  | 3      | 3  |   |
| 6872 | KAP   | LYR      | K2 III    | 4.632       | 2.166  | 1.960  | 1.996  | 1.636  | 0.513  | 0.552  | 0.880  | 1.155  | 1.404  | 1.522  | 1.702  | 1.863  | 2      | 2  |   |
| 6875 |       |          | B3 WN     | 5.270       | -1.150 | -1.060 | -0.700 | -0.240 | -0.060 | -0.060 | -0.080 |        |        |        |        |        |        | 2  | 0 |
| 6879 | EPS   | SGR      | A0 V      | X           | 1.853  | 0.099  | 0.003  | -0.190 | -0.086 | 0.023  | 0.014  | -0.017 | 0.000  | 0.023  | 0.034  | 0.053  | 0.063  | 3  | 2 |
| 6884 | ZET   | SCT      | K0 III    | 4.875       | 1.438  | 1.250  | 1.355  | 1.225  | 0.447  | 0.451  | 0.710  | 0.985  | 1.195  | 1.276  | 1.420  | 1.543  | 2      | 3  |   |
| 6895 | 109   | HER      | K2 III    | 4.147       | 2.113  | 1.877  | 1.976  | 1.596  | 0.510  | 0.591  | 0.920  | 1.227  | 1.484  | 1.599  | 1.790  | 1.967  | 2      | 2  |   |
| 6896 | D     | 21       | SGR       | K2 II       | 5.139  | 1.973  | 1.812  | 1.843  | 0.649  | 0.676  | 1.096  | 1.437  | 1.839  | 2.037  | 2.308  | 2.633  | 2      | 2  |   |
| 6897 | ALF   | TEL      | B3 IV     | 3.536       | -1.183 | -1.087 | -0.692 | -0.246 | -0.082 | -0.032 | -0.055 | -0.113 | -0.162 | -0.205 | -0.333 | -0.374 | 1      | 1  |   |
| 6905 | ZET   | TEL      | GK0       | X           | 4.363  | 1.666  | 1.364  | 1.558  | 1.258  | 0.400  | 0.488  | 0.804  | 1.038  | 1.316  | 1.411  | 1.565  | 1.812  | 1  | 2 |
| 6913 | LAM   | SGR      | K2 III    | X           | 3.035  | 1.834  | 1.571  | 1.800  | 1.453  | 0.540  | 0.467  | 0.766  | 0.988  | 1.224  | 1.343  | 1.519  | 1.721  | 1  | 2 |
| 6918 | VO    | 59       | SER       | GO III+A6 V | 5.331  | 0.597  | 0.558  | 0.572  | 0.529  | 0.246  | 0.287  | 0.473  | 0.646  | 0.833  | 0.914  | 1.069  | 1.191  | 4  | 1 |
| 6920 | D     | PHI      | DRA       | A0P         | 4.237  | -0.566 | -0.535 | -0.337 | -0.113 | -0.037 | -0.019 | -0.012 | -0.084 | -0.098 | -0.119 | -0.164 | -0.252 | 2  | 2 |
| 6923 | D     | 39       | DRA       | A1 V        | 5.012  | 0.109  | 0.096  | 0.119  | 0.091  | 0.042  | 0.045  | 0.077  | 0.033  | 0.105  | 0.121  | 0.141  | -0.022 | 2  | 1 |
| 6927 | CHI   | DRA      | F7 V      | 3.691       | 0.169  | 0.083  | 0.300  | 0.551  | 0.261  | 0.252  | 0.453  | 0.609  | 0.762  | 0.818  | 0.884  | 0.945  | 2      | 3  |   |
| 6930 | GAM   | SCT      | A3 V      | 4.709       | 0.264  | 0.204  | 0.057  | 0.044  | 0.035  | 0.054  | 0.086  | 0.133  | 0.136  | 0.153  | 0.173  | 0.192  | 2      | 2  |   |
| 6934 | DEL   | 1        | TEL       | B6 IV       | 5.020  | -0.740 | -0.640 | -0.460 | -0.170 | -0.040 | -0.010 | -0.020 |        |        |        |        |        | 2  | 0 |
| 6938 | DEL   | 2        | TEL       | B5 IV       | 5.180  | -1.110 | -0.860 | -0.600 | -0.200 | -0.040 | -0.030 | -0.030 |        |        |        |        |        | 2  | 0 |
| 6945 | 42    | DRA      | K2 III    | 5.113       | 2.155  | 1.814  | 1.932  | 1.596  | 0.530  | 0.562  | 0.920  | 1.232  | 1.497  | 1.640  | 1.827  | 2.040  | 2      | 2  |   |
| 6947 | V     | U        | SGR       | CF5         | 6.844  | 1.925  | 1.577  | 1.332  | 1.319  | 0.582  | 0.518  | 0.888  |        |        |        |        |        |    |   |



## THIRTEEN-COLOR PHOTOMETRY OF 1380 BRIGHT STARS

TABLE 7 (CONTINUED)

| B.S.   | NAME  | SP. TYPE | 52        | 33-52 | 35-52  | 37-52  | 40-52  | 45-52  | 52-58  | 52-63  | 52-72  | 52-80  | 52-86  | 52-99  | 52-11C | NB     | NR  |
|--------|-------|----------|-----------|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|-----|
| 7141/2 | THE   | SER      | A5 V      | 4.673 | 0.205  | 0.176  | 0.182  | 0.179  | 0.056  | 0.095  | 0.148  | 0.213  | 0.244  | 0.238  | 0.264  | 0.294  | 2 2 |
| 7150   | XI 2  | SGE      | K1 III    | 3.776 | 2.151  | 1.880  | 1.957  | 1.650  | 0.558  | 0.564  | 0.883  | 1.165  | 1.407  | 1.528  | 1.721  | 1.910  | 1 1 |
| 7157 V | R     | LYR      | M5 III    | 4.391 | 3.662  | 2.822  | 2.482  | 1.886  | 1.045  | 0.482  | 1.362  | 2.753  | 3.596  | 3.940  | 4.615  | 4.975  | 1 2 |
| 7176   | EPS   | AOL      | K2 III    | 4.313 | 1.934  | 1.725  | 1.776  | 1.460  | 0.473  | 0.512  | 0.834  | 1.052  | 1.260  | 1.379  | 1.545  | 1.723  | 2 3 |
| 7178   | GAM   | LYR      | B9 III    | 3.242 | 0.018  | -0.040 | -0.272 | -0.078 | 0.006  | 0.006  | 0.037  | -0.013 | -0.018 | 0.012  | 0.007  | 0.018  | 6 2 |
| 7180   | UPS   | DRA      | K2 III    | 5.102 | 2.078  | 1.836  | 1.910  | 1.580  | 0.524  | 0.542  | 0.879  | 1.128  | 1.379  | 1.497  | 1.657  | 1.850  | 2 2 |
| 7193   | 12    | AOL      | K1 III    | 4.295 | 1.894  | 1.674  | 1.772  | 1.477  | 0.498  | 0.526  | 0.854  | 1.067  | 1.309  | 1.423  | 1.587  | 1.601  | 2 2 |
| 7194   | ZET   | SGR      | A2 IV     | 2.612 | 0.210  | 0.132  | 0.155  | 0.094  | 0.045  | 0.061  | 0.045  | 0.056  | 0.064  | 0.058  | 0.092  | 0.194  | 1 2 |
| 7217   | OMI   | SGR      | G68       | 4.016 | 1.645  | 1.416  | 1.522  | 1.329  | 0.440  | 0.518  | 0.808  | 1.074  | 1.284  | 1.377  | 1.524  | 1.733  | 1 1 |
| 7234   | TAU   | SGR      | K1 III    | 3.607 | 2.195  | 1.881  | 2.079  | 1.584  | 0.532  | 0.584  | 0.905  | 1.163  | 1.417  | 1.549  | 1.755  | 1.974  | 2 2 |
| 7235   | ZET   | AOL      | A0 VNNH   | 2.981 | 0.016  | 0.037  | 0.006  | 0.007  | 0.008  | -0.007 | 0.008  | 0.022  | 0.028  | 0.020  | 0.037  | 0.026  | 2 3 |
| 7236   | LAM   | AOL      | B91 V'N   | 3.415 | -0.448 | -0.397 | -0.294 | -0.124 | -0.025 | -0.041 | -0.047 | -0.055 | -0.092 | -0.117 | -0.162 | -0.198 | 3 2 |
| 7254   | ALF   | CRA      | A2 V      | 4.119 | 0.172  | 0.091  | 0.154  | 0.029  | 0.041  | 0.030  | 0.021  | -0.004 | 0.016  | 0.019  | 0.020  | 0.066  | 2 2 |
| 7257   |       |          | B5 V      | 5.930 | -0.780 | -0.690 | -0.470 | -0.140 | -0.010 | 0.000  | 0.000  |        |        |        |        |        | 2 0 |
| 7259   | BET   | CRA      | G63       | 4.368 | 2.175  | 1.848  | 1.974  | 1.631  | 0.614  | 0.522  | 0.835  | 1.110  | 1.375  | 1.480  | 1.654  | 1.668  | 2 2 |
| 7264   | PI    | SGR      | F2 II-III | 2.973 | 0.761  | 0.592  | 0.371  | 0.413  | 0.238  | 0.219  | 0.306  | 0.441  | 0.538  | 0.591  | 0.669  | 0.744  | 2 2 |
| 7298   | ETA   | LYR      | B2 IV     | 4.386 | -1.076 | -0.990 | -0.720 | -0.226 | -0.041 | -0.034 | -0.070 | -0.098 | -0.134 | -0.179 | -0.285 | -0.322 | 2 2 |
| 7306   | 1     | VUL      | B3 IV     | 4.747 | -0.865 | -0.799 | -0.531 | -0.134 | -0.001 | -0.010 | -0.012 | -0.014 | 0.003  | -0.029 | -0.134 | -0.139 | 2 2 |
| 7310   | DEL   | DRA      | G9 III    | 3.329 | 1.584  | 1.361  | 1.448  | 1.293  | 0.452  | 0.480  | 0.760  | 0.987  | 1.232  | 1.321  | 1.466  | 1.617  | 2 2 |
| 7314   | THE   | LYR      | K0 II     | 4.629 | 2.308  | 2.082  | 2.098  | 1.767  | 0.606  | 0.570  | 0.903  | 1.191  | 1.468  | 1.586  | 1.790  | 1.963  | 2 3 |
| 7316   |       |          | B4 IV     | 5.640 | -0.950 | -0.860 | -0.590 | -0.190 | -0.030 | -0.030 | -0.040 |        |        |        |        |        | 2 0 |
| 7328   | KAP   | CYG      | K0 III    | 3.994 | 1.485  | 1.305  | 1.379  | 1.246  | 0.446  | 0.438  | 0.725  | 0.951  | 1.158  | 1.246  | 1.376  | 1.542  | 2 2 |
| 7340   | RHO 1 | SGR      | F0 IV     | 3.972 | 0.313  | 0.260  | 0.234  | 0.265  | 0.093  | 0.127  | 0.180  | 0.273  | 0.339  | 0.376  | 0.397  | 0.452  | 2 2 |
| 7342   | UPS   | SGR      | A PE      | 4.664 | -0.650 | -0.830 | -0.582 | -0.022 | 0.019  | 0.207  | 0.318  | 0.437  | 0.487  | 0.564  | 0.512  | 0.587  | 2 2 |
| 7352   | TAU   | DRA      | K3 III    | 4.780 | 2.541  | 2.296  | 2.314  | 1.813  | 0.522  | 0.629  | 0.967  | 1.242  | 1.520  | 1.650  | 1.839  | 1.978  | 2 1 |
| 7355   |       |          | B5 IV     | 6.010 | -1.120 | -1.020 | -0.660 | -0.170 | -0.020 | -0.010 | -0.010 |        |        |        |        |        | 2 0 |
| 7358   | 3     | VUL      | B6 III    | 5.168 | -0.890 | -0.818 | -0.513 | -0.190 | -0.048 | -0.041 | -0.072 | -0.109 | -0.134 | -0.183 | -0.214 | -0.237 | 2 2 |
| 7371   | PI    | DRA      | A2 IV     | 4.614 | 0.140  | 0.111  | 0.080  | 0.034  | 0.000  | 0.027  | 0.033  | -0.019 | 0.031  | 0.041  | 0.069  | 0.054  | 2 2 |
| 7372   | 2     | CYG      | B3 IV     | 4.980 | -1.149 | -1.057 | -0.673 | -0.192 | -0.030 | -0.028 | -0.054 | -0.041 | -0.061 | -0.088 | -0.205 | -0.128 | 2 2 |
| 7377   | DEL   | AOL      | F0 IV     | 3.430 | 0.223  | 0.160  | 0.224  | 0.346  | 0.158  | 0.158  | 0.263  | 0.362  | 0.447  | 0.475  | 0.499  | 0.565  | 2 2 |
| 7387   | NU    | AOL      | F2 I8     | 4.821 | 1.476  | 1.227  | 0.624  | 0.604  | 0.317  | 0.339  | 0.514  | 0.788  | 0.960  | 1.099  | 1.275  | 1.386  | 2 2 |
| 7405   | ALF   | VUL      | M0+ III   | 4.863 | 3.319  | 2.817  | 2.798  | 2.198  | 0.632  | 0.749  | 1.216  | 1.790  | 2.226  | 2.398  | 2.716  | 2.981  | 2 3 |
| 7417   | BET   | CYG      | K3 II     | 3.399 | 1.273  | 1.244  | 1.405  | 1.376  | 0.514  | 0.612  | 0.949  | 1.262  | 1.552  | 1.675  | 1.905  | 2.110  | 2 2 |
| 7420   | IOT   | CYG      | A5 V      | 3.827 | 0.280  | 0.240  | 0.162  | 0.163  | 0.078  | 0.064  | 0.141  | 0.167  | 0.217  | 0.210  | 0.280  | 0.295  | 2 2 |
| 7426   | 8     | CYG      | B3 IV     | 4.740 | -1.052 | -0.951 | -0.666 | -0.226 | -0.044 | -0.051 | -0.052 | -0.126 | -0.154 | -0.182 | -0.302 | -0.219 | 2 3 |
| 7429   | NU    | AOL      | K3 III    | 4.779 | 2.173  | 1.949  | 2.034  | 1.602  | 0.470  | 0.614  | 0.957  | 1.198  | 1.443  | 1.566  | 1.733  | 1.970  | 2 2 |
| 7437   | 9     | VUL      | B7 V      | 5.017 | -0.686 | -0.640 | -0.483 | -0.171 | -0.032 | 0.004  | 0.003  | -0.067 | -0.079 | -0.066 | -0.125 | -0.131 | 2 2 |
| 7446   | KAP   | AOL      | B0.5 III  | 4.988 | -1.295 | -1.206 | -0.753 | -0.102 | 0.063  | 0.055  | 0.079  | 0.102  | 0.111  | 0.087  | -0.006 | -0.004 | 2 2 |
| 7447   | IOT   | AOL      | B5 III    | 4.359 | -0.731 | -0.669 | -0.472 | -0.146 | -0.017 | 0.004  | 0.004  | -0.034 | -0.041 | -0.048 | -0.107 | -0.122 | 2 2 |
| 7462   | SIG   | DRA      | K0 V      | 4.896 | 0.784  | 0.686  | 0.981  | 0.965  | 0.326  | 0.412  | 0.682  | 0.916  | 1.105  | 1.181  | 1.265  | 1.393  | 2 2 |
| 7469   | THE   | SIG      | F4 V      | 4.588 | 0.144  | 0.091  | 0.240  | 0.444  | 0.204  | 0.199  | 0.346  | 0.457  | 0.557  | 0.601  | 0.631  | 0.715  | 3 2 |
| 7478   | PHI   | CYG      | B6 III-IV | 4.930 | 1.522  | 1.367  | 1.422  | 1.273  | 0.434  | 0.465  | 0.756  | 0.956  | 1.193  | 1.302  | 1.454  | 1.611  | 2 3 |
| 7479   | ALF   | SGE      | G0 II     | 4.580 | 1.037  | 0.828  | 0.890  | 0.968  | 0.374  | 0.362  | 0.623  | 0.793  | 0.985  | 1.053  | 1.155  | 1.263  | 2 2 |
| 7488   | BET   | SGE      | G6 II     | 4.641 | 1.750  | 1.569  | 1.582  | 1.405  | 0.498  | 0.475  | 0.778  | 0.991  | 1.215  | 1.314  | 1.469  | 1.633  | 2 2 |
| 7503   | 16 A  | CYG      | G2 V      | 6.145 | 0.516  | 0.423  | 0.639  | 0.754  | 0.308  | 0.337  | 0.567  | 0.719  | 0.889  | 0.944  | 1.010  | 1.120  | 4 2 |
| 7504   | 16 B  | CYG      | G5 V      | 6.396 | 0.539  | 0.437  | 0.682  | 0.768  | 0.306  | 0.341  | 0.559  | 0.736  | 0.905  | 0.948  | 1.034  | 1.144  | 5 4 |
| 7525   | GAM   | AOL      | K3 II     | 3.126 | 3.081  | 2.716  | 2.755  | 2.208  | 0.687  | 0.739  | 1.139  | 1.508  | 1.835  | 2.000  | 2.257  | 2.487  | 2 2 |
| 7527   |       |          | B5 V      | 6.290 | -0.980 | -0.870 | -0.600 | -0.220 | -0.060 | -0.030 | -0.030 |        |        |        |        |        | 2 0 |
| 7528   | DEL   | SIG      | B9.5 III  | 2.893 | -0.114 | -0.078 | -0.140 | -0.071 | 0.006  | -0.005 | 0.007  | 0.006  | 0.004  | 0.002  | 0.006  | -0.009 | 2 4 |
| 7536   | DEL   | SGE      | B2 II+III | 4.211 | 2.068  | 1.940  | 1.955  | 1.739  | 0.729  | 0.659  | 1.214  | 2.004  | 2.618  | 2.855  | 3.237  | 3.522  | 2 3 |
| 7546 D | ZET   | SGE      | A3 V      | 5.069 | 0.167  | 0.152  | 0.110  | 0.096  | 0.047  | 0.064  | 0.095  | 0.146  | 0.179  | 0.201  | 0.227  | 0.236  | 2 3 |
| 7557   | ALF   | AOL      | A7 IV+V   | 0.799 | 0.235  | 0.182  | 0.202  | 0.255  | 0.098  | 0.120  | 0.182  | 0.236  | 0.304  | 0.328  | 0.339  | 0.364  | 3 3 |
| 7564 V | CHI   | CYG      | B6 PE     | 8.708 | 4.300  | 2.380  | 1.132  | 1.294  | 1.828  | 0.601  | 2.428  | 4.684  | 6.235  | 6.810  | 8.200  | 8.645  | 1 1 |
| 7565   | 12    | VUL      | B3 V      | 4.960 | -1.110 | -1.003 | -0.662 | -0.242 | -0.054 | -0.043 | -0.075 | -0.062 | -0.077 | -0.084 | -0.202 | -0.291 | 2 2 |
| 7570 V | ETA   | AOL      | G2 I8     | 4.056 | 1.432  | 1.190  | 1.055  | 1.094  | 0.446  | 0.474  | 0.736  | 0.905  | 1.098  | 1.177  | 1.349  | 1.530  | 1 1 |
| 7574   | 9     | SGE      | O8F       | 6.281 | -1.340 | -1.253 | -0.755 | -0.073 | 0.078  | 0.056  | 0.111  | 0.157  | 0.182  | 0.203  | 0.118  | 0.029  | 2 2 |
| 7581   | IOT   | SGR      | K0 III    | 4.396 | 1.862  | 1.496  | 1.680  | 1.392  | 0.537  | 0.544  | 0.821  | 1.151  | 1.348  | 1.381  | 1.624  | 1.950  | 2 2 |
| 7582 D | EPS   | DRA      | G8 III    | 4.078 | 1.178  | 0.982  | 1.115  | 1.096  | 0.432  | 0.419  | 0.714  | 0.888  | 1.112  | 1.204  | 1.332  | 1.505  | 2 2 |
| 7589   |       |          | O9.5 III  | 5.653 | -1.454 | -1.347 | -0.837 | -0.170 | 0.026  | -0.003 | 0.019  | -0.010 | -0.016 | -0.046 | -0.149 | -0.222 | 2 2 |
| 7590   | EPS   | PAV      | A0 V      | 3.950 | -0.207 | -0.028 | -0.061 | -0.010 | 0.008  | 0.009  | 0.022  | 0.002  | 0.000  | -0.005 | -0.033 | 0.011  | 3 3 |
| 7592   | 13    | VUL      | B9.5 III  | 4.544 | -0.200 | -0.203 | -0.208 | -0.062 | -0.013 | 0.023  | -0.006 | 0.079  | 0.096  | 0.106  | 0.120  | 0.128  | 2 2 |
| 7595   | XI    | AOL      | K0 III    | 4.975 | 1.740  | 1.518  | 1.605  | 1.368  | 0.469  | 0.506  | 0.820  | 1.046  | 1.264  | 1.377  | 1.541  | 1.740  | 2 2 |
| 7597   | OME   | SGR      | DG5       | 4.878 | 0.873  | 0.664  | 0.883  | 0.921  | 0.400  | 0.385  | 0.598  | 0.747  | 0.950  | 1.026  | 1.132  | 1.183  | 2 2 |
| 7602   | BET   | AOL      | G6 IV     | 3.955 | 0.997  | 0.853  | 1.069  | 1.025  | 0.366  | 0.436  | 0.725  | 0.892  | 1.099  | 1.188  | 1.326  | 1.479  | 2 2 |
| 7613   | 22    | CYG      | B6 III    | 4.950 | -0.831 | -0.759 | -0.556 | -0.161 | -0.016 | -0.017 | -0.018 | -0.042 | -0.040 | -0.065 | -0.131 | -0.145 | 2 2 |
| 7615   | ETA   | CYG      | K0 III    | 4.157 | 1.661  | 1.474  | 1.561  | 1.340  | 0.459  | 0.495  | 0.797  | 1.025  | 1.261  | 1.339  | 1.506  | 1.680  | 2 1 |
| 7619 D | PSI   | CYG      | A3 IV     | 5.000 | 0.238  | 0.206  | 0.167  | 0.158  | 0.073  | 0.097  | 0.163  | 0.208  | 0.201  | 0.176  | 0.146  | 0.118  | 2 2 |
| 7635   | GAM   | SGE      | K5+ III   | 3.981 | 3.389  | 2.960  | 2.968  | 2.336  | 0.659  | 0.826  | 1.277  | 1.753  | 2.156  | 2.320  | 2.627  | 2.884  | 2 2 |
| 7650   | 62    | SGR      | M4 III    | 4.911 | 3.689  | 3.038  | 2.910  | 2.221  | 0.889  | 0.621  | 1.285  | 2.273  | 2.948  | 3.222  | 3.668  | 4.051  | 2 2 |
| 7652   |       |          | GK5       | 5.173 | 2.993  | 2.543  | 2.694  | 1.991  | 0.606  | 0.742  | 1.109  | 1.483  | 1.778  | 1.904  | 2.150  | 2.432  | 2 2 |
| 7653   | 15    | VUL      | AM        | 4.739 | 0.391  | 0.307  | 0.223  | 0.202  | 0.071  | 0.112  | 0.182  | 0.209  | 0.2    |        |        |        |     |

## H. L. JOHNSON AND R. I. MITCHELL

321

TABLE 7 (CONTINUED)

| B.S.    | NAME  | SP. TYPE | 52          | 33-52 | 35-52  | 37-52  | 40-52  | 45-52  | 52-58  | 52-63  | 52-72  | 52-80  | 52-86  | 52-99  | 52-110 | NB     | NR   |
|---------|-------|----------|-------------|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|------|
| 7773    | NU    | CAP      | B9 V        | 4.764 | -0.174 | -0.162 | -0.144 | -0.080 | -0.020 | 0.004  | -0.007 | -0.013 | -0.021 | -0.030 | -0.051 | -0.038 | 2 1  |
| 7776    | BET   | CAP      | GK01+LATE B | 3.294 | 0.735  | 0.701  | 0.823  | 0.895  | 0.374  | 0.422  | 0.681  | 0.905  | 1.105  | 1.198  | 1.354  | 1.561  | 2 2  |
| 7790    | ALF   | PAV      | B2.5V       | 1.926 | -1.170 | -1.095 | -0.726 | -0.256 | -0.010 | -0.032 | -0.093 | -0.183 | -0.224 | -0.277 | -0.379 | -0.362 | 5 2  |
| 7796    | GAM   | CEP      | F8 IB       | 2.392 | 1.295  | 1.027  | 0.781  | 0.842  | 0.334  | 0.339  | 0.529  | 0.654  | 0.818  | 0.865  | 1.000  | 1.097  | 4 2  |
| 7806    | 39    | CEP      | K3 III      | 4.787 | 2.682  | 2.365  | 2.451  | 1.932  | 0.588  | 0.687  | 1.071  | 1.420  | 1.715  | 1.645  | 2.102  | 2.286  | 2 2  |
| 7822 D  | RHO   | CAP      | F2 IV       | 4.844 | 0.247  | 0.187  | 0.273  | 0.424  | 0.201  | 0.193  | 0.328  | 0.442  | 0.526  | 0.591  | 0.606  | 0.696  | 2 2  |
| 7834    | .41   | CEP      | F5 II       | 4.098 | 0.816  | 0.646  | 0.412  | 0.484  | 0.205  | 0.205  | 0.353  | 0.476  | 0.595  | 0.642  | 0.725  | 0.786  | 2 3  |
| 7844    | OMG 1 | CEP      | B2 V        | 4.931 | -1.017 | -0.936 | -0.658 | -0.151 | -0.013 | -0.006 | -0.007 | -0.044 | -0.055 | -0.041 | -0.138 | -0.183 | 2 2  |
| 7847    | 44    | CEP      | F5 IAB      | 6.477 | 1.861  | 1.577  | 1.157  | 1.073  | 0.517  | 0.570  | 0.903  | 1.193  | 1.467  | 1.647  | 1.937  | 2.132  | 2 4  |
| 7850    | THE   | CEP      | AM          | 4.249 | 0.365  | 0.302  | 0.260  | 0.252  | 0.091  | 0.080  | 0.146  | 0.197  | 0.231  | 0.250  | 0.258  | 0.287  | 2 2  |
| 7852    | EPS   | DEL      | B6 III      | 4.017 | -0.834 | -0.747 | -0.538 | -0.192 | -0.045 | -0.039 | -0.054 | -0.086 | -0.118 | -0.143 | -0.209 | -0.235 | 2 5  |
| 7866    | 47    | CEP      | K2 IB+B     | 5.059 | 1.621  | 1.646  | 1.903  | 1.965  | 0.797  | 0.810  | 1.291  | 1.830  | 2.230  | 2.440  | 2.777  | 3.039  | 2 2  |
| 7869    | ALF   | IND      | K0 III      | 3.345 | 1.616  | 1.369  | 1.505  | 1.317  | 0.500  | 0.476  | 0.738  | 0.972  | 1.192  | 1.300  | 1.468  | 1.678  | 2 2  |
| 7882 D  | BET   | DEL      | F5 IV       | 3.729 | 0.398  | 0.308  | 0.374  | 0.536  | 0.229  | 0.225  | 0.366  |        |        |        |        |        | 2 0  |
| 7884    | 71    | AOL      | G8 III      | 4.523 | 1.439  | 1.260  | 1.337  | 1.232  | 0.442  | 0.419  | 0.682  | 1.000  | 1.193  | 1.285  | 1.415  | 1.593  | 2 2  |
| 7891    | 29    | VUL      | B9.5 V      | 4.802 | -0.185 | -0.152 | -0.122 | -0.055 | -0.017 | -0.005 | -0.028 | -0.011 | -0.023 | -0.025 | -0.040 | -0.039 | 2 1  |
| 7906    | ALF   | DEL      | B9 V        | 3.764 | -0.341 | -0.297 | -0.266 | -0.095 | -0.026 | -0.015 | -0.028 | -0.024 | -0.035 | -0.041 | -0.059 | -0.064 | 2 56 |
| 7913    | BET   | PAV      | A7 III      | 3.461 | 0.437  | 0.312  | 0.244  | 0.206  | 0.134  | 0.117  | 0.112  | 0.183  | 0.231  | 0.263  | 0.313  | 0.362  | 2 2  |
| 7924    | ALF   | CEP      | A2 IA       | 1.309 | -0.015 | -0.136 | -0.379 | 0.035  | 0.102  | 0.063  | 0.118  | 0.185  | 0.218  | 0.244  | 0.284  | 0.289  | 8 2  |
| 7928    | DEL   | DEL      | A7P III     | 4.464 | 0.292  | 0.229  | 0.225  | 0.300  | 0.127  | 0.170  | 0.264  | 0.448  | 0.520  | 0.561  | 0.570  | 0.635  | 2 2  |
| 7936    | PSI   | CAP      | F5 V        | 4.234 | 0.223  | 0.107  | 0.291  | 0.459  | 0.212  | 0.243  | 0.356  | 0.500  | 0.633  | 0.629  | 0.689  | 0.942  | 3 2  |
| 7939    | 30    | VUL      | K2 III      | 5.203 | 2.187  | 1.917  | 1.993  | 1.613  | 0.524  | 0.570  | 0.900  | 1.186  | 1.446  | 1.564  | 1.766  | 1.957  | 2 2  |
| 7942    | 52    | CEP      | K0 III      | 4.448 | 1.739  | 1.529  | 1.622  | 1.410  | 0.473  | 0.483  | 0.785  | 1.054  | 1.277  | 1.382  | 1.558  | 1.705  | 2 3  |
| 7947/8  | GAM   | DEL      | F8IV-V/K2IV | 4.079 | 1.042  | 0.915  | 1.041  | 1.023  | 0.366  | 0.441  | 0.702  | 0.822  | 1.025  | 1.203  | 1.368  | 1.506  | 2 1  |
| 7949    | EPS   | CEP      | K0 III      | 2.703 | 1.643  | 1.435  | 1.527  | 1.342  | 0.465  | 0.481  | 0.782  | 1.034  | 1.265  | 1.352  | 1.549  | 1.719  | 3 3  |
| 7950    | EPS   | AOP      | A1 V        | 3.791 | 0.096  | 0.093  | -0.026 | -0.016 | -0.004 | 0.014  | 0.024  | 0.044  | 0.054  | 0.057  | 0.072  | 0.033  | 2 2  |
| 7951    | 3     | AOR      | M3 III      | 4.867 | 3.734  | 3.150  | 3.026  | 2.405  | 0.815  | 0.699  | 1.293  | 2.159  | 2.729  | 2.981  | 3.358  | 3.693  | 2 2  |
| 7952    | ZET   | IND      | GK5         | 5.162 | 2.373  | 1.922  | 2.021  | 1.588  | 0.575  | 0.554  | 0.898  | 1.372  | 1.734  | 1.884  | 2.174  | 2.478  | 1 2  |
| 7955    |       |          | F8 IV-V     | 4.628 | 0.427  | 0.334  | 0.487  | 0.641  | 0.267  | 0.272  | 0.441  | 0.624  | 0.778  | 0.847  | 0.860  | 0.980  | 2 2  |
| 7957    | ETA   | CEP      | K0 IV       | 3.643 | 1.263  | 1.078  | 1.259  | 1.161  | 0.416  | 0.448  | 0.718  | 1.022  | 1.227  | 1.341  | 1.439  | 1.640  | 2 1  |
| 7963 D  | LAM   | CEP      | B5 V        | 4.477 | -0.827 | -0.752 | -0.543 | -0.161 | -0.032 | -0.030 | -0.057 | -0.080 | -0.100 | -0.136 | -0.193 | -0.200 | 2 2  |
| 7977    | 55    | CEP      | B3 IA       | 4.933 | -0.399 | -0.417 | -0.191 | 0.339  | 0.269  | 0.227  | 0.387  | 0.540  | 0.678  | 0.748  | 0.817  | 0.918  | 2 2  |
| 7980    | DME   | CAP      | K5 III      | 4.594 | 2.990  | 2.493  | 2.539  | 2.393  | 0.764  | 0.840  | 1.273  | 1.774  | 2.208  | 2.385  | 2.700  | 2.777  | 2 2  |
| 7986    | BET   | IND      | K0 III      | 3.961 | 2.390  | 2.011  | 2.169  | 1.739  | 0.634  | 0.606  | 0.873  | 1.162  | 1.402  | 1.533  | 1.746  | 1.990  | 2 2  |
| 7990    | MU    | AOR      | A8M         | 4.838 | 0.355  | 0.301  | 0.325  | 0.408  | 0.170  | 0.183  | 0.269  | 0.394  | 0.472  | 0.506  | 0.508  | 0.559  | 2 2  |
| 7995    | 31    | VUL      | G8 III      | 4.754 | 1.085  | 0.919  | 1.031  | 1.045  | 0.396  | 0.382  | 0.625  | 0.855  | 1.053  | 1.129  | 1.246  | 1.408  | 2 3  |
| 8001    | 57    | CEP      | B5 V        | 4.765 | -0.967 | -0.883 | -0.580 | -0.182 | -0.033 | -0.038 | -0.078 | -0.108 | -0.149 | -0.198 | -0.262 | -0.259 | 2 2  |
| 8020    |       |          | B8 IA       | 5.795 | -0.077 | -0.157 | -0.047 | 0.451  | 0.316  | 0.234  | 0.437  | 0.650  | 0.780  | 0.895  | 0.983  | 1.037  | 2 1  |
| 8028    | NU    | CEP      | A0 V        | 3.971 | 0.092  | 0.076  | -0.112 | -0.015 | 0.017  | 0.008  | 0.045  | 0.066  | 0.075  | 0.082  | 0.106  | 0.106  | 2 2  |
| 8047 V  | 59    | CEP      | B1 IV:E     | 4.595 | -1.364 | -1.296 | -0.769 | -0.096 | 0.048  | 0.017  | 0.105  | 0.212  | 0.233  | 0.162  | 0.035  | 0.117  | 1 1  |
| 8060    | ETA   | CAP      | A4S         | 4.888 | 0.204  | 0.168  | 0.197  | 0.179  | 0.069  | 0.102  | 0.128  | 0.223  | 0.265  | 0.276  | 0.309  | 0.375  | 2 2  |
| 8075    | THE   | CAP      | A0 V        | 4.115 | -0.017 | -0.020 | 0.003  | -0.001 | 0.003  | 0.007  | 0.017  | 0.008  | 0.007  | 0.005  | 0.000  | 0.012  | 2 2  |
| 8079    | XI    | CEP      | K5 IB       | 4.135 | 3.115  | 2.804  | 2.770  | 2.332  | 0.758  | 0.804  | 1.236  | 1.733  | 2.122  | 2.297  | 2.598  | 2.912  | 2 2  |
| 8080    | 24    | CAP      | M1 III      | 4.969 | 3.627  | 3.046  | 3.038  | 2.367  | 0.741  | 0.846  | 1.273  | 1.849  | 2.276  | 2.458  | 2.785  | 3.084  | 2 2  |
| 8085    | 61 A  | CEP      | K5V         | 5.698 | 1.736  | 1.513  | 1.864  | 1.486  | 0.301  | 0.820  | 1.182  | 1.636  | 1.880  | 1.979  | 2.172  | 2.359  | 2 2  |
| 8086    | 61 B  | CEP      | K7 V        | 6.540 | 2.027  | 1.776  | 2.061  | 1.707  | 0.407  | 0.888  | 1.337  | 1.804  | 2.240  | 2.374  | 2.597  | 2.941  | 2 1  |
| 8089    | 63    | CEP      | K4 IB-IIA   | 4.960 | 3.292  | 2.910  | 2.886  | 2.356  | 0.719  | 0.760  | 1.209  | 1.611  | 1.963  | 2.132  | 2.401  | 2.673  | 2 2  |
| 8093    | NU    | AOR      | G8 III      | 4.728 | 1.410  | 1.232  | 1.342  | 1.225  | 0.439  | 0.429  | 0.712  | 0.953  | 1.158  | 1.275  | 1.405  | 1.562  | 2 2  |
| 8097    | GAM   | CEP      | F0P         | 4.789 | 0.238  | 0.206  | 0.284  | 0.344  | 0.115  | 0.125  | 0.216  | 0.274  | 0.327  | 0.352  | 0.384  | 0.413  | 2 2  |
| 8115    | ZET   | CEP      | G8 II       | 3.447 | 1.510  | 1.373  | 1.444  | 1.335  | 0.479  | 0.442  | 0.708  | 0.914  | 1.123  | 1.229  | 1.372  | 1.512  | 5 2  |
| 8123 D  | DEL   | CEP      | F7 V        | 4.597 | 0.232  | 0.160  | 0.351  | 0.560  | 0.258  | 0.253  | 0.438  | 0.522  | 0.685  | 0.737  | 0.789  | 0.906  | 2 2  |
| 8130 D  | TAU   | CEP      | F0 IV       | 3.842 | 0.286  | 0.207  | 0.306  | 0.463  | 0.229  | 0.196  | 0.335  | 0.474  | 0.575  | 0.624  | 0.666  | 0.740  | 2 2  |
| 8131    | ALF   | CEP      | G0 III+4S V | 4.020 | 0.690  | 0.611  | 0.653  | 0.607  | 0.240  | 0.256  | 0.460  | 0.614  | 0.766  | 0.819  | 0.934  | 1.075  | 2 2  |
| 8143 *  | SIG   | CEP      | B9 IAB      | 4.236 | -0.446 | -0.435 | -0.429 | 0.037  | 0.101  | 0.080  | 0.167  | 0.168  | 0.215  | 0.289  | 0.279  | 0.322  | 1 2  |
| 8146    | UPS   | CEP      | B2 VE       | 4.374 | -1.293 | -1.213 | -0.736 | -0.177 | -0.010 | -0.019 | 0.030  | 0.044  | 0.096  | 0.019  | -0.101 | -0.093 | 2 2  |
| 8162    | ALF   | CEP      | A7 IV,V     | 2.501 | 0.302  | 0.246  | 0.244  | 0.272  | 0.110  | 0.108  | 0.181  | 0.242  | 0.291  | 0.329  | 0.356  | 0.384  | 3 1  |
| 8167    | IOD   | CAP      | G8 III      | 4.490 | 1.236  | 1.053  | 1.168  | 1.120  | 0.424  | 0.422  | 0.688  | 0.892  | 1.106  | 1.175  | 1.313  | 1.454  | 2 2  |
| 8173    | 1     | PEG      | K1 III      | 4.249 | 1.026  | 1.727  | 1.805  | 1.490  | 0.494  | 0.528  | 0.833  | 1.118  | 1.363  | 1.461  | 1.633  | 1.802  | 2 2  |
| 8181    | GAM   | PAV      | F8 V        | 4.346 | 0.164  | -0.003 | 0.290  | 0.488  | 0.293  | 0.288  | 0.428  | 0.623  | 0.810  | 0.819  | 0.879  | 1.036  | 2 2  |
| 8204    | ZET   | CAP      | G4 IBP      | 3.965 | 1.352  | 1.163  | 1.332  | 1.343  | 0.514  | 0.468  | 0.677  | 0.905  | 1.088  | 1.163  | 1.287  | 1.460  | 2 3  |
| 8225    | 2     | PEG      | M1 III      | 4.951 | 3.491  | 3.020  | 2.982  | 2.353  | 0.691  | 0.791  | 1.267  | 1.832  | 2.311  | 2.490  | 2.819  | 3.066  | 2 2  |
| 8232    | BET   | AOR      | G0 IB       | 3.094 | 1.322  | 1.063  | 1.022  | 1.058  | 0.397  | 0.402  | 0.636  | 0.851  | 1.024  | 1.095  | 1.217  | 1.333  | 2 2  |
| 8238 DV | CEP   | B2 III   |             | 3.186 | -1.562 | -1.431 | -0.961 | -0.316 | -0.084 | -0.097 | -0.139 | -0.292 | -0.341 | -0.416 | -0.538 | -0.558 | 2 2  |
| 8252    | RHO   | CEP      | G8 III      | 4.196 | 1.224  | 1.046  | 1.167  | 1.125  | 0.419  | 0.416  | 0.690  | 0.997  | 1.202  | 1.286  | 1.414  | 1.593  | 2 2  |
| 8254    | UPS   | OCT      | K0 III      | 4.018 | 1.710  | 1.436  | 1.621  | 1.307  | 0.468  | 0.530  | 0.766  | 1.021  | 1.144  | 1.393  | 1.531  | 1.755  | 2 2  |
| 8255    | 72    | CEP      | K0 III      | 5.143 | 1.859  | 1.673  | 1.737  | 1.449  | 0.468  | 0.548  | 0.852  | 1.115  | 1.337  | 1.447  | 1.632  | 1.817  | 2 2  |
| 8260    | EPS   | CAP      | B3 V+P      | 4.633 | -1.014 | -0.949 | -0.800 | -0.262 | -0.046 | -0.058 | -0.048 | -0.103 | -0.135 | -0.128 | -0.223 | -0.226 | 2 2  |
| 8264    | XI    | AOR      | A7 V        | 4.749 | 0.320  | 0.258  | 0.215  | 0.212  | 0.081  | 0.086  | 0.151  | 0.212  | 0.250  | 0.273  | 0.299  | 0.331  | 1 1  |
| 8262 V. | W     | CEP      | GK4E        | 5.733 | 3.735  | 2.766  | 2.291  | 1.780  | 1.207  | 0.532  | 1.592  | 3.321  | 4.344  | 4.750  | 5.633  | 6.061  | 1 1  |
| 8278    | GAM   | CAP      | A8M         | 3.764 | 0.482  | 0.418  | 0.361  | 0.407  | 0.133  | 0.1    |        |        |        |        |        |        |      |

## THIRTEEN-COLOR PHOTOMETRY OF 1380 BRIGHT STARS

TABLE 7 (CONTINUED)

| B.S.    | NAME  | SP. TYPE | 52         | 33-52 | 35-52  | 37-52  | 40-52  | 45-52  | 52-58  | 52-63  | 52-72  | 52-80  | 52-86  | 52-99  | 52-110 | NB     | NR     |   |
|---------|-------|----------|------------|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|---|
| 8411    | LAM   | GRU      | K2 III     | 4.817 | 2.892  | 2.541  | 2.601  | 2.056  | 0.581  | 0.699  | 1.073  |        |        |        |        | 1      | 0      |   |
| 8413    | NU    | PEG      | K4 III     | 5.270 | 3.105  | 2.742  | 2.768  | 2.136  | 0.579  | 0.766  | 1.167  | 1.545  | 1.882  | 2.028  | 2.277  | 2.526  | 2      |   |
| 8414    | ALF   | AOR      | G2 IB      | 3.179 | 1.590  | 1.333  | 1.300  | 1.289  | 0.481  | 0.450  | 0.708  | 0.889  | 1.158  | 1.229  | 1.371  | 1.517  | 2      |   |
| 8417 D  | XI    | CEP      | AM         | 4.332 | 0.298  | 0.244  | 0.324  | 0.433  | 0.182  | 0.194  | 0.289  | 0.411  | 0.508  | 0.531  | 0.563  | 0.619  | 2      |   |
| 8418    | IOT   | AOR      | B8 V       | 4.259 | -0.550 | -0.489 | -0.305 | -0.099 | -0.019 | -0.045 | -0.044 | -0.080 | -0.092 | -0.120 | -0.164 | -0.134 | 2      |   |
| 8425    | ALF   | GRU      | B7 IV      | X     | 1.736  | -0.770 | -0.757 | -0.506 | -0.211 | -0.015 | -0.003 | -0.064 | -0.088 | -0.109 | -0.145 | -0.208 | -0.198 | 2 |
| 8430    | IOT   | PEG      | F5 V       | 3.858 | 0.180  | 0.123  | 0.307  | 0.505  | 0.227  | 0.219  | 0.367  | 0.543  | 0.665  | 0.703  | 0.745  | 0.850  | 3      |   |
| 8431    | MU    | PSA      | A2 V       | 4.480 | 0.157  | 0.136  | 0.072  | 0.064  | 0.068  | 0.007  | 0.007  |        |        |        |        |        | 1      |   |
| 8450    | THE   | PEG      | A2 V       | 3.546 | 0.169  | 0.136  | 0.138  | 0.105  | 0.041  | 0.025  | 0.036  | 0.069  | 0.084  | 0.089  | 0.121  | 0.181  | 2      |   |
| 8454    | PI    | PEG      | F5 II-III  | 4.384 | 0.634  | 0.489  | 0.417  | 0.550  | 0.261  | 0.233  | 0.386  | 0.507  | 0.649  | 0.686  | 0.766  | 0.914  | 2      |   |
| 8465    | ZET   | CEP      | K1 IB      | 3.741 | 3.100  | 2.759  | 2.724  | 2.271  | 0.768  | 0.731  | 1.132  | 1.459  | 1.779  | 1.938  | 2.197  | 2.440  | 2      |   |
| 8468    | 24    | CEP      | G8 III     | 5.026 | 1.382  | 1.184  | 1.238  | 1.182  | 0.434  | 0.421  | 0.699  | 0.943  | 1.148  | 1.228  | 1.346  | 1.518  | 2      |   |
| 8469    | AM    | CEP      | D6F        | 5.137 | -0.911 | -0.877 | -0.470 | 0.153  | 0.191  | 0.146  | 0.250  | 0.375  | 0.465  | 0.462  | 0.435  | 0.566  | 2      |   |
| 8485    |       |          | K3 III     | 4.853 | 2.589  | 2.358  | 2.370  | 1.938  | 0.625  | 0.705  | 1.087  | 1.440  | 1.755  | 1.893  | 2.156  | 2.413  | 2      |   |
| 8486    | MU 1  | GRU      | G64        | X     | 4.988  | 1.147  | 0.890  | 1.030  | 0.959  | 0.418  | 0.420  | 0.624  | 0.752  | 0.942  | 1.015  | 1.179  | 1.108  | 2 |
| 8494    | EPS   | CEP      | F0 IV      | 4.243 | 0.269  | 0.207  | 0.250  | 0.328  | 0.152  | 0.149  | 0.228  | 0.360  | 0.442  | 0.451  | 0.477  | 0.554  | 2      |   |
| 8498    | 1     | LAC      | K3 II-III  | 4.478 | 2.937  | 2.627  | 2.637  | 2.118  | 0.655  | 0.701  | 1.066  | 1.400  | 1.708  | 1.867  | 2.107  | 2.354  | 2      |   |
| 8499    | THE   | AOR      | G8 III-IV  | 4.402 | 1.577  | 1.392  | 1.472  | 1.297  | 0.439  | 0.468  | 0.739  | 0.976  | 1.191  | 1.259  | 1.427  | 1.585  | 2      |   |
| 8502    | ALF   | TUC      | K3 III     | X     | 3.249  | -0.810 | -0.382 | -0.537 | 1.971  | 0.637  | 0.737  | 1.073  | 1.403  | 1.709  | 1.859  | 2.123  | 2.405  | 2 |
| 8518    | GAM   | AOR      | B9 III     | 3.859 | -0.180 | -0.171 | -0.149 | -0.082 | -0.028 | 0.007  | -0.017 | -0.021 | -0.021 | -0.028 | -0.034 | -0.035 | 2      |   |
| 8520    | 31    | PEG      | B2 V       | 5.006 | -1.264 | -1.169 | -0.780 | -0.228 | -0.037 | -0.040 | -0.068 | -0.063 | -0.072 | -0.128 | -0.249 | -0.266 | 2      |   |
| 8521 V  | PI 1  | GRU      | S4+7       | X     | 5.981  | 4.055  | 3.751  | 3.592  | 3.072  | 1.348  | 0.683  | 1.649  | 3.092  | 4.155  | 4.671  | 5.404  | 4      |   |
| 8522    | 32    | PEG      | B8 III     | 4.828 | -0.264 | -0.247 | -0.266 | -0.029 | 0.005  | 0.035  | 0.046  | 0.050  | 0.064  | 0.062  | 0.069  | 0.069  | 2      |   |
| 8523    | 2     | LAC      | B6 IV      | 4.541 | -0.868 | -0.786 | -0.551 | -0.166 | -0.037 | -0.035 | -0.049 | -0.086 | -0.091 | -0.113 | -0.188 | -0.199 | 2      |   |
| 8538    | BET   | LAC      | G9 III     | 4.660 | 1.582  | 1.350  | 1.464  | 1.311  | 0.459  | 0.484  | 0.783  | 1.061  | 1.297  | 1.396  | 1.575  | 1.752  | 2      |   |
| 8539    | PI    | AOR      | B1 NNEK    | 4.630 | -1.416 | -1.344 | -0.801 | -0.110 | 0.042  | 0.034  | 0.150  | 0.188  | 0.278  | 0.205  | 0.108  | 0.195  | 2      |   |
| 8541    | 4     | LAC      | B9 IAB     | 4.626 | -0.384 | -0.395 | -0.409 | 0.027  | 0.088  | 0.089  | 0.142  | 0.177  | 0.224  | 0.275  | 0.263  | 0.301  | 2      |   |
| 8551    | 35    | PEG      | K0 III-IV  | 5.059 | 1.741  | 1.505  | 1.640  | 1.399  | 0.478  | 0.523  | 0.842  | 1.124  | 1.360  | 1.494  | 1.665  | 1.848  | 3      |   |
| 8556    | DEL 1 | GRU      | G65        | X     | 4.211  | 1.714  | 1.436  | 1.561  | 1.388  | 0.534  | 0.495  | 0.733  | 0.955  | 1.201  | 1.286  | 1.422  | 1.734  | 2 |
| 8558/9  | ZET   | AOR      | F2 IV      | 3.770 | 0.286  | 0.185  | 0.276  | 0.472  | 0.213  | 0.215  | 0.373  | 0.516  | 0.641  | 0.671  | 0.712  | 0.796  | 2      |   |
| 8560    | DEL 2 | GRU      | G66        | X     | 4.421  | 3.786  | 3.090  | 2.933  | 2.268  | 0.888  | 0.607  | 1.237  | 2.173  | 2.846  | 3.089  | 3.542  | 3.973  | 2 |
| 8571 V. | DEL   | CEP      | F5 IB-G11B | 4.450 | 1.388  | 1.149  | 1.096  | 1.097  | 0.427  | 0.400  | 0.664  | 0.856  | 1.052  | 1.120  | 1.255  | 1.355  | 1      |   |
| 8572 D  | 5     | LAC      | M0 IAB+B   | 4.805 | 2.214  | 2.119  | 2.288  | 2.200  | 0.853  | 0.823  | 1.355  | 1.952  | 2.423  | 2.647  | 3.012  | 3.296  | 2      |   |
| 8573    | SIG   | AOR      | A0 IV      | 4.882 | -0.082 | -0.050 | -0.061 | -0.027 | 0.001  | -0.001 | -0.005 | -0.009 | -0.037 | -0.041 | -0.064 | -0.061 | 2      |   |
| 8576    | BET   | PSA      | A0 IV      | 4.286 | 0.036  | 0.032  | 0.041  | 0.008  | 0.008  | 0.014  | -0.011 |        |        |        |        |        | 1      |   |
| 8579    | 6     | LAC      | B2 IV      | 4.480 | -1.151 | -1.065 | -0.716 | -0.158 | 0.003  | -0.019 | -0.030 | -0.036 | -0.063 | -0.095 | -0.174 | -0.179 | 2      |   |
| 8582    | UPS   | TUC      | G64        | X     | 5.148  | 3.843  | 3.089  | 3.026  | 2.263  | 0.868  | 0.662  | 1.288  | 2.342  | 3.012  | 3.285  | 3.728  | 4      |   |
| 8585    | ALF   | LAC      | A2 V       | 3.750 | -0.028 | -0.034 | 0.007  | 0.019  | -0.003 | -0.003 | 0.015  | -0.014 | -0.011 | -0.023 | -0.015 | 0.005  | 2      |   |
| 8597    | ETA   | AOR      | B8 V       | 4.026 | -0.448 | -0.397 | -0.320 | -0.123 | -0.037 | -0.019 | -0.041 | -0.040 | -0.032 | -0.080 | -0.123 | -0.127 | 2      |   |
| 8613    | 9     | LAC      | A7 IV      | 4.667 | 0.336  | 0.272  | 0.236  | 0.272  | 0.129  | 0.112  | 0.198  | 0.287  | 0.368  | 0.390  | 0.415  | 0.406  | 2      |   |
| 8622    | 10    | LAC      | D9 V       | 4.846 | -1.662 | -1.540 | -1.000 | -0.293 | -0.047 | -0.066 | -0.102 | -0.173 | -0.209 | -0.271 | -0.422 | -0.458 | 99     |   |
| 8628    | EPS   | PSA      | B7 V       | 4.179 | -0.556 | -0.507 | -0.487 | -0.145 | 0.003  | -0.031 | -0.063 |        |        |        |        |        | 1      |   |
| 8632    | 11    | LAC      | K3 III     | 4.815 | 2.541  | 2.206  | 2.279  | 1.835  | 0.579  | 0.644  | 1.007  | 1.367  | 1.640  | 1.786  | 2.018  | 2.215  | 2      |   |
| 8634    | ZET   | PEG      | B8 V       | 3.410 | -0.460 | -0.398 | -0.356 | -0.155 | -0.041 | -0.017 | -0.029 | -0.061 | -0.065 | -0.070 | -0.112 | -0.123 | 2      |   |
| 8636    | BET   | GRU      | K1 II      | X     | 2.413  | 3.608  | 2.875  | 2.783  | 2.154  | 0.935  | 0.595  | 1.254  | 2.359  | 3.061  | 3.374  | 3.889  | 4      |   |
| 8641    | DMI   | PEG      | A1 V       | 4.806 | 0.007  | -0.005 | -0.048 | -0.020 | 0.002  | 0.009  | -0.012 | -0.008 | -0.004 | -0.025 | 0.001  | -0.005 | 2      |   |
| 8644    | RHO   | GRU      | G68        | X     | 5.103  | 1.660  | 1.341  | 1.562  | 1.294  | 0.494  | 0.514  | 0.772  | 1.017  | 1.257  | 1.355  | 1.474  | 1      |   |
| 8649    | 66    | AOR      | K4 III     | 5.022 | 2.774  | 2.415  | 2.492  | 1.961  | 0.597  | 0.688  | 1.064  | 1.444  | 1.735  | 1.914  | 2.127  | 2.356  | 2      |   |
| 8650    | ETA   | PEG      | B8 II+F7   | 3.130 | 1.225  | 1.052  | 1.114  | 1.068  | 0.401  | 0.402  | 0.650  | 0.873  | 1.087  | 1.178  | 1.320  | 1.471  | 2      |   |
| 8655    | ETA   | GRU      | G62        | X     | 5.152  | 2.227  | 1.736  | 1.917  | 1.520  | 0.561  | 0.593  | 0.906  | 1.247  | 1.522  | 1.649  | 1.864  | 2      |   |
| 8665    | XI    | PEG      | F7 V       | 4.307 | 0.238  | 0.151  | 0.317  | 0.552  | 0.253  | 0.266  | 0.427  | 0.600  | 0.751  | 0.800  | 0.861  | 0.967  | 2      |   |
| 8667    | LAM   | PEG      | G8 II-III  | 4.192 | 1.782  | 1.586  | 1.630  | 1.439  | 0.493  | 0.491  | 0.770  | 1.024  | 1.246  | 1.349  | 1.513  | 1.704  | 2      |   |
| 8675    | EPS   | GRU      | A2 V       | X     | 3.510  | 0.320  | 0.205  | 0.122  | 0.072  | 0.063  | 0.080  | 0.059  | 0.111  | 0.127  | 0.206  | 0.229  | 2      |   |
| 8679    | TAU   | AOR      | M0 III     | 4.440 | 3.438  | 2.964  | 2.968  | 2.361  | 0.667  | 0.782  | 1.229  | 1.769  | 2.373  | 2.669  | 2.972  | 3.222  | 2      |   |
| 8684    | MU    | PEG      | G8 III     | 3.728 | 1.387  | 1.197  | 1.301  | 1.210  | 0.446  | 0.432  | 0.689  | 0.981  | 1.181  | 1.268  | 1.398  | 1.533  | 2      |   |
| 8694    | IOT   | CEP      | K1 III     | 3.737 | 1.753  | 1.557  | 1.640  | 1.405  | 0.477  | 0.506  | 0.782  | 1.050  | 1.290  | 1.384  | 1.546  | 1.724  | 2      |   |
| 8695    | GAM   | PSA      | A0 V       | 4.474 | -0.151 | -0.152 | -0.170 | -0.051 | 0.017  | -0.006 | -0.041 |        |        |        |        |        | 1      |   |
| 8698    | LAM   | AOR      | M2 III     | 4.140 | 3.278  | 2.846  | 2.839  | 2.361  | 0.774  | 0.775  | 1.288  | 2.039  | 2.548  | 2.773  | 3.125  | 3.430  | 2      |   |
| 8702    | DEL   | K3 III   |            | 5.058 | 2.400  | 2.109  | 2.186  | 1.753  | 0.541  | 0.616  | 0.980  | 1.314  | 1.584  | 1.734  | 1.930  | 2.128  | 2      |   |
| 8709    | DEL   | AOR      | A3 V       | 3.281 | 0.226  | 0.189  | 0.107  | 0.073  | 0.026  | 0.044  | 0.049  | 0.094  | 0.108  | 0.121  | 0.136  | 0.134  | 2      |   |
| 8717    | RHO   | PEG      | A1 V       | 4.891 | 0.005  | 0.017  | -0.028 | -0.008 | 0.003  | 0.017  | 0.001  | 0.034  | 0.033  | 0.024  | 0.043  | 0.083  | 2      |   |
| 8720    | DEL   | PSA      | G68        | X     | 4.436  | 1.495  | 1.201  | 1.398  | 1.190  | 0.473  | 0.469  | 0.732  | 0.910  | 1.183  | 1.253  | 1.449  | 1      |   |
| 8728    | ALF   | PSA      | A3 V       | X     | 1.172  | 0.189  | 0.121  | 0.181  | 0.108  | 0.054  | 0.049  | 0.034  | 0.075  | 0.070  | 0.056  | 0.116  | 0      |   |
| 8729    | 51    | PEG      | D60        | 5.612 | 0.601  | 0.510  | 0.699  | 0.796  | 0.309  | 0.332  | 0.545  | 0.722  | 0.846  | 0.923  | 0.987  | 1.126  | 2      |   |
| 8747    | ZET   | GRU      | G5 III     | X     | 4.336  | 1.550  | 1.228  | 1.427  | 1.237  | 0.473  | 0.470  | 0.732  | 1.025  | 1.254  | 1.353  | 1.528  | 1      |   |
| 8748    |       |          | K4 III     | 5.042 | 3.018  | 2.641  | 2.699  | 2.093  | 0.595  | 0.719  | 1.115  | 1.475  | 1.811  | 1.965  | 2.178  | 2.414  | 2      |   |
| 8752 V. |       |          | G0 IA      | 5.399 | 2.728  | 2.346  | 2.179  | 2.003  | 0.808  | 0.808  | 1.225  | 1.689  | 2.046  | 2.262  | 2.605  | 2.828  | 1      |   |
| 8762    | DMI   | AND      | B6P        | 3.637 | -0.881 | -0.806 | -0.641 | -0.179 | -0.022 | -0.008 | -0.026 | -0.014 | -0.028 | -0.024 | -0.085 | -0.093 | 1      |   |
| 8773    | BET   | PSA      | B5PE       | 4.505 | -0.827 | -0.769 | -0.511 | -0.162 | -0.026 | -0.025 | -0.055 | -0.013 | -0.006 | -0.009 | -0.104 | -0.116 | 2      |   |
| 8775 V  | BET   | PEG      | M2 II-III  | 2.849 | 3.905  | 3.244  | 3.113  | 2.472  | 0.846  | 0.699  | 1.296  | 2.162  | 2.766  | 2.969  | 3.363  | 3.767  | 2      |   |
| 8780    | 3     | AND      | K0 III     | 4.894 | 1.725  | 1.536  | 1.615  | 1.398  | 0.484  | 0.501  | 0.808  | 1.098  | 1.324  | 1.440  | 1.611  | 1.791  | 2      |   |
| 8781    | ALF   | PEG      | B9.5 III   | 2.502 | -0.017 | -0.021 | -0.125 | -0.054 | 0.001  | 0.000  | -0.018 | 0.007  | -0.0   |        |        |        |        |   |

TABLE 7 (CONTINUED)

| B.S. | NAME | SP. | TYPE   |           | 52    | 33-52  | 35-52  | 37-52  | 40-52  | 45-52  | 52-58  | 52-63  | 52-72  | 52-80  | 52-86  | 52-99  | 52-110 | NB | NR |
|------|------|-----|--------|-----------|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|----|----|
| 8863 | GAM  | SCL | G8 III | X         | 4.691 | 2.013  | 1.709  | 1.878  | 1.498  | 0.524  | 0.559  | 0.837  | 1.088  | 1.306  | 1.452  | 1.649  | 1.805  | 2  | 2  |
| 8872 | D    | CEI | K0 III |           | 4.948 | 1.104  | 0.943  | 1.072  | 1.056  | 0.397  | 0.410  | 0.676  | 0.892  | 1.071  | 1.154  | 1.298  | 1.472  | 2  | 2  |
| 8880 | TAU  | PEG | A5 IV  |           | 4.606 | 0.236  | 0.186  | 0.159  | 0.169  | 0.075  | 0.083  | 0.134  | 0.186  | 0.273  | 0.282  | 0.325  | 0.369  | 2  | 2  |
| 8892 | 98   | AGR | K0 III |           | 4.219 | 1.868  | 1.579  | 1.710  | 1.442  | 0.512  | 0.531  | 0.838  | 1.125  | 1.368  | 1.505  | 1.684  | 1.873  | 8  | 6  |
| 8905 | UPS  | PEG | F8 IV  |           | 4.557 | 0.516  | 0.390  | 0.444  | 0.677  | 0.290  | 0.293  | 0.499  | 0.689  | 0.838  | 0.876  | 0.962  | 1.039  | 2  | 2  |
| 8906 | 99   | AGR | K5 III |           | 4.810 | 3.183  | 2.777  | 2.809  | 2.205  | 0.638  | 0.764  | 1.195  | 1.607  | 1.952  | 2.116  | 2.367  | 2.597  | 7  | 3  |
| 8911 | KAP  | PSC | A2P    |           | 4.968 | -0.069 | -0.112 | -0.004 | 0.039  | -0.016 | 0.070  | 0.072  | 0.076  | 0.074  | 0.048  | 0.044  | 0.014  | 2  | 3  |
| 8916 | THE  | PSC | K1 III |           | 4.554 | 1.857  | 1.664  | 1.730  | 1.451  | 0.483  | 0.531  | 0.838  | 1.057  | 1.317  | 1.414  | 1.585  | 1.763  | 2  | 2  |
| 8923 | 70   | PEG | G8 III |           | 4.768 | 1.463  | 1.290  | 1.367  | 1.240  | 0.443  | 0.459  | 0.732  | 0.950  | 1.165  | 1.257  | 1.402  | 1.569  | 2  | 2  |
| 8926 | V    | AR  | B3 V   |           | 4.871 | -1.069 | -0.969 | -0.639 | -0.183 | -0.028 | -0.021 | -0.039 | -0.056 | -0.076 | -0.116 | -0.200 | -0.195 | 2  | 3  |
| 8939 | 101  | AGR | A1     |           | 4.705 | 0.108  | 0.087  | -0.034 | 0.024  | 0.054  | 0.016  | 0.034  |        |        |        |        |        | 1  | 0  |
| 8961 | V    | LAM | AND    | G8 III-IV | 3.995 | 1.433  | 1.194  | 1.329  | 1.233  | 0.445  | 0.514  | 0.832  | 1.155  | 1.371  | 1.476  | 1.658  | 1.876  | 2  | 3  |
| 8965 | 10T  | AND | B8 V   |           | 4.288 | -0.488 | -0.450 | -0.405 | -0.122 | -0.014 | -0.037 | -0.033 | -0.075 | -0.082 | -0.091 | -0.076 | -0.133 | 2  | 2  |
| 8969 | 10T  | PSC | F7 V   |           | 4.228 | 0.288  | 0.197  | 0.356  | 0.580  | 0.256  | 0.252  | 0.438  | 0.564  | 0.709  | 0.750  | 0.790  | 0.909  | 9  | 2  |
| 8974 | GAM  | CEP | K1 IV  |           | 3.480 | 1.700  | 1.533  | 1.650  | 1.366  | 0.431  | 0.505  | 0.812  | 1.036  | 1.287  | 1.395  | 1.533  | 1.726  | 2  | 2  |
| 8976 | KAP  | AND | B8 V   |           | 4.136 | -0.407 | -0.368 | -0.256 | -0.119 | -0.039 | -0.012 | -0.037 | -0.070 | -0.068 | -0.090 | -0.116 | -0.065 | 2  | 3  |
| 8982 | 104  | AGR | G0 IB  |           | 4.981 | 1.179  | 0.943  | 0.952  | 1.006  | 0.379  | 0.388  | 0.626  | 0.845  | 1.044  | 1.103  | 1.211  | 1.368  | 2  | 4  |
| 8984 | LAM  | PSC | A7 V   |           | 4.547 | 0.222  | 0.180  | 0.205  | 0.224  | 0.083  | 0.106  | 0.165  | 0.221  | 0.263  | 0.269  | 0.277  | 0.342  | 2  | 2  |
| 8988 | DMG  | 2   | AGR    | B9.5 V    | 4.456 | -0.256 | -0.214 | -0.115 | -0.047 | 0.003  | -0.019 | -0.038 | -0.063 | -0.084 | -0.088 | -0.097 | -0.085 | 2  | 2  |
| 8997 | D    | 78  | PEG    | K0 III    | 5.134 | 1.374  | 1.194  | 1.292  | 1.201  | 0.433  | 0.447  | 0.718  | 0.963  | 1.187  | 1.281  | 1.429  | 1.607  | 2  | 3  |
| 9016 | DEL  | SCL | A0 V   |           | 4.570 | -0.038 | -0.022 | -0.024 | 0.007  | 0.037  | -0.003 | -0.031 |        |        |        |        |        | 1  | 0  |
| 9045 | V    | RHO | CAS    | G0 IAP    | 4.811 | 2.311  | 1.814  | 1.537  | 1.407  | 0.641  | 0.572  | 0.865  | 1.177  | 1.435  | 1.638  | 1.850  | 2.028  | 2  | 4  |
| 9064 | PSI  | PEG | M3 III |           | 5.024 | 3.197  | 2.775  | 2.712  | 2.262  | 0.785  | 0.700  | 1.272  | 2.133  | 2.721  | 2.960  | 3.358  | 3.668  | 2  | 2  |
| 9071 | D    | SIG | CAS    | B1 V      | 4.894 | -1.248 | -1.159 | -0.731 | -0.148 | 0.014  | 0.002  | -0.013 | -0.053 | -0.061 | -0.068 | -0.196 | -0.192 | 2  | 3  |
| 9072 | DMG  | PSC | F4 IV  |           | 4.134 | 0.318  | 0.217  | 0.277  | 0.441  | 0.200  | 0.233  | 0.377  | 0.515  | 0.624  | 0.654  | 0.695  | 0.784  | 2  | 3  |
| 9076 | EPS  | TUC | B9 IV  |           | 4.481 | -0.342 | -0.340 | -0.358 | -0.116 | -0.005 | 0.003  | -0.018 |        |        |        |        |        | 1  | 0  |
| 9084 | THE  | OCT | K2 III | X         | 5.141 | 2.552  | 2.121  | 2.292  | 1.719  | 0.550  | 0.683  | 0.998  | 1.316  | 1.592  | 1.730  | 1.910  | 2.183  | 4  | 2  |
| 9089 | 30   | PSC | M3 IV  |           | 4.805 | 3.697  | 3.067  | 2.927  | 2.330  | 0.843  | 0.650  | 1.259  | 2.220  | 2.837  | 3.093  | 3.522  | 3.867  | 2  | 3  |
| 9091 | ZET  | SCL | B5 V   |           | 5.005 | -0.895 | -0.830 | -0.566 | -0.175 | -0.009 | -0.049 | -0.081 |        |        |        |        |        | 1  | 0  |
| 9098 | 2    | CET | B9 IV  |           | 4.523 | -0.133 | -0.117 | -0.195 | -0.059 | 0.016  | -0.018 | -0.009 | -0.038 | -0.054 | -0.029 | -0.049 | -0.014 | 3  | 2  |

## NOTES TO TABLE 7

|      |                    |                                                           |      |           |                                               |
|------|--------------------|-----------------------------------------------------------|------|-----------|-----------------------------------------------|
| 215  | ζ And              | 58 filters differ by more than 0.10 Mag.                  | 7066 | R Sct     | 39974.9 matched to 38917.8                    |
| 681  | ο Cet              | 39831.6 matched to 39151.6                                | 7564 | x Cyg     | 40004.9 matched to 40006.9 (unpublished data) |
| 1239 | λ Tau              | 39873.6 matched to 39440.8                                | 4163 |           | 33-52 = 12. is lower limit.                   |
| 1845 | CE Tau             | 39831.8 matched to 39499.7                                |      |           | 33 was not measurable.                        |
| 2061 | α Ori              | 39797.9 matched to 38787.7                                | 4846 |           | 33-52 = 12. is lower limit.                   |
| 2308 | BL Ori             | 39773.9 matched to 39501.8                                |      |           | 33 was not measurable.                        |
| 2590 | π CMa              | 58 filters differ by more than 0.10 Mag. May be variable. | 8297 |           | 33-52 = 12. is lower limit.                   |
| 2650 | ζ Gem              | 39804.9 matched to 38789.8                                | 7570 | η Aql     | 39976.9 matched to 38871.9                    |
| 4163 | U Hya              | 58 filters differ by more than 0.10 Mag.                  | 8262 | W Cyg     | 58 filters differ by more than 0.10 Mag.      |
| 4846 | Y Cvn              | 39867.9 matched to 39176.9                                | 8297 | V460 Cyg  | 400022.8 matched to 39407.6                   |
| 4915 | α <sup>2</sup> Cvn | 39930.7 matched to 38894.7                                | 8316 | μ Cep     | 58 filters differ by more than 0.10 Mag.      |
| 5056 | α Vir              | 39930.8 matched to 39176.9                                |      |           | 58 filters differ by more than 0.10 Mag.      |
| 5589 | RR UMi             | 39910.9 matched to 39257.8                                | 8383 | VV Cep    | 58 filters differ by more than 0.10 Mag.      |
| 6146 | g Her              | 39969.8 matched to 38929.7                                |      |           | 39278.8 matched to 39459.6                    |
| 6406 | α Her              | 39973.7 matched to 39227.9                                | 8571 | δ Cep     | 58 filters differ by more than 0.10 Mag.      |
| 6431 | μ Her              | 58 filters differ by more than 0.10 Mag.                  | 8752 | HD 217476 |                                               |

metric system can be obtained from Infrared Industries, Thin Films Division, P.O. Box 557, Waltham, Mass., U.S.A. 02154. Mr. Perry, of Infrared Industries has on file the specifications necessary to produce satisfactory duplicates of our filters.

## REFERENCES

- Borgman, J. 1963, *Bull. Astr. Inst. Neth.*, **17**, 58.  
 Chavarría, K. C., and Johnson, H. L. 1975, *unpublished*.  
 Cousins, A. W. J., and Stoy, R. H. 1963, *Royal Obs. Bull.*, **64**, E 103.

- Cousins, A. W. J., Lake, R., and Stoy, R. H. 1966, *Royal Obs. Bull.*, **121**, E 3.  
 Hayes, D. S. 1970, *Ap. J.*, **159**, 165.  
 Hayes, D. S., and Latham, D. W. 1975, *Ap. J.*, **197**, 593.  
 Hoffleit, D. 1964, *Catalogue of Bright Stars* (New Haven, Conn: Yale University Observatory).  
 Johnson, H. L., and Mitchell, R. I. 1962, *Comm. Lunar and Planetary Lab.*, **1**, 73.  
 Johnson, H. L., Mitchell, R. I., and Latham, A. S. 1967, *Comm. Lunar and Planetary Lab.*, **6**, 85.  
 Johnson, H. L., Mitchell, R. I., Iriarte, B., and Wisniewski, W. Z. 1966, *Comm. Lunar and Planetary Lab.*, **4**, 99.



- Johnson, H. L., and Morgan, W. W. 1953, *Ap. J.*, **117**, 313.
- King, I. 1952a, *A. J.*, **57**, 253.
- 1952b, *Ap. J.*, **115**, 580.
- Mendoza, V., E. E. 1969, *Bol. Obs. Tonantzintla y Tacubaya*, **5**, 104.
- 1971a, *Bol. Obs. Tonantzintla y Tacubaya*, **6**, 73.
- 1971b, *Bol. Obs. Tonantzintla y Tacubaya*, **6**, 89.
- 1971c, in *The Magellanic Clouds*, ed. A. B. Muller (Dordrecht-Holland: D. Reidel Publishing Co.), p. 69.
- Mitchell, R. I., and Johnson, H. L. 1969, *Comm. Lunar and Planetary Lab.*, **8**, 1.
- Oke, J. B., and Schild, R. E. 1970, *Ap. J.*, **161**, 1015.
- Strömgren, B. 1937, *Handbuch der Experimentalphysik*, ed. W. Wien and T. Harms (Leipzig: Akademische Verlags-Gesellschaft M. B. H.).
- Willstrop, R. V. 1960, *M. N. R. A. S.*, **121**, 17.
- 1965, *Memoirs Roy. Astr. Soc.*, **69**, 83.
- Wesselink, A. J. 1950, *Trans. I. A. U.*, **7**, 269.